AN INTERDISCIPLINARY INVESTIGATION INTO CAROLINGIAN MEDICAL KNOWLEDGE AND PRACTICE

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This dissertation is submitted for the degree of Doctor of Philosophy.

Declaration

This thesis is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text. It is not substantially the same as any that I have submitted, or, is being concurrently submitted for a degree or diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. I further state that no substantial part of my thesis has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. It does not exceed the prescribed word limit for the relevant Degree Committee.

Dissertation Summary

Title: An Interdisciplinary Investigation into Carolingian Medical Knowledge and Practice
Name: Claire Burridge
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My Wellcome Trust-funded PhD dissertation integrates textual and osteological evidence to explore the relationship between medical knowledge and practice in eighth- and ninth-century western Europe. The guiding questions of my work consider the potential practicality and applicability of the medical knowledge circulating during this period: is there a correlation, a connection, or any overlap between the medical issues recorded in the texts and those seen on skeletons? Could those individuals in possession of the recorded medical knowledge have attempted to treat the ailments from which people suffered?

To investigate the applicability and practicality of the medical knowledge circulating in the Carolingian world, I first identified, transcribed, and translated remedies recorded in eighteen eighth- and ninth-century Latin manuscripts. I then analysed the potential practicality of the ingredients listed in these remedies, asking: do they rely on products that could have been obtained in western Europe in this period? To assess the applicability of this medical knowledge, I compared the symptoms recorded in these texts to evidence of disease preserved in roughly contemporary skeletal remains. Although bringing together textual and skeletal evidence poses a number of significant methodological challenges, this combined approach has made it possible to explore topics that neither category of material could effectively investigate in isolation.

After an introduction (Chapter 1), Chapters 2-5 concentrate on the textual analysis of the medical recipes from the eighteen manuscripts under consideration:

Chapter 2 introduces these manuscripts and the method of analysis while Chapters 3-5 focus on individual case studies. Chapters 6-9 assess the written record in light of osteological evidence: Chapter 6 addresses my approach to the question of applicability and Chapters 7-9 highlight specific pathologies. Ultimately, this interdisciplinary project has produced a more nuanced picture of early medieval health and medicine, revealing that a significant proportion of the medical recipes in circulation were both practical *and* applicable, thereby suggesting that these texts were intended to be used in the practice of medicine. (321 words)

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Acknowledgements

As clichéd as it may sound, writing the acknowledgements has been about the most difficult part of this dissertation. There is no way that I can encompass my gratitude in a few paragraphs and it is truly impossible to express my thanks to everyone who has supported me along the way. Where do I begin…?

Prof. Rosamond McKitterick, my supervisor and academic superhero. Rosamond has been a truly inspiring mentor, guiding the project from start to finish, even after retirement. No amount of thanks will ever be enough. From reading chapter drafts in the eleventh hour to putting up with my Americanisms and excessive use of the dreaded dash: thank you. It is a true honour to be PhD student #49, the 'baby' of the Rosamondings.

A number of other faculty members have also been extremely helpful in offering feedback and answering questions. In particular, my thanks go to Prof. Tessa Webber, Dr Piers Mitchell, and Dr Debby Banham. I am also grateful to many faculty members in the Department of Archaeology who allowed me to join courses during the first two years of the PhD. My fellow medieval history graduate students and the standard GEMS contingent have been a great support network and sounding board; many thanks especially to Revd Dr Robert Evans, Dr Sam Ottewill-Soulsby, Dr Tom Lambert, Dr Arthur Westwell, and Prof. Lesley Abrams. I have also hugely appreciated the feedback and advice received from mentors beyond Cambridge, such as Dr Carine van Rhijn and Prof. Dr Klaus-Dietrich Fischer, as well as the very useful conversations, questions, and suggestions picked up on the conference circuit: my sincere thanks to all involved. An immense thank you must also go to my examiners, Drs Caroline Goodson and Zubin Mistry. Their thoughtful and thought-provoking feedback and suggestions have enormously enriched the dissertation and will continue to influence my research relating to this project and beyond.

My PhD has been generously supported by the Wellcome Trust via a Medical Humanities Doctoral Studentship [203431/Z/16/Z]. The Wellcome Trust has been a fantastic organisation with which to work, in no small part due to the efforts of Dr Tom

Bray. Many thanks, too, to Prof. Jo Story, who originally suggested that I apply for funding from the Wellcome Trust.

Sidney Sussex College has provided such a fantastic community for the past four and a half years: my deepest thanks to everyone who has made it the wonderful, welcoming place it is. Finally, my friends and family also deserve more thanks than I can give. I am so grateful to my friends in Sidney and beyond, the best support network in the world. Truly. Above all, however, my parents deserve the greatest thanks: they have read more drafts of my work than I can count, offered advice whenever it was sought, and sent lots of encouragement and love whenever it was needed. I could never have done this without you!

I take full responsibility for any remaining mistakes. While the submission of this dissertation marks the end of one phase of research, I hope it is just the beginning of new projects and academic adventures.

Abbreviations

AMTL	Ante-mortem tooth loss
BAV	Rome, Biblioteca Apostolica Vaticana
BnF	Paris, Bibliothèque nationale de France
csg.	Codex sangallensis
MGH	*Monumenta Germaniae Historica*
Cap.	*Capitularia, Legum sectio* II, *Capitularia regum Francorum* I
Epp. kar. aevi.	*Epistolae Karolini aevi*
Form.	*Formulae Merowingici et Karolini aevi*
LL	*Leges* (in folio)
Poet.	*Poetae Latini aevi Carolini*
SRG	*Scriptores rerum Germanicarum in usum scholarum separatim editi*
SS	*Scriptores* (in folio)
OA	Osteoarthritis
PMTL	Post-mortem tooth loss
RA	Rheumatoid arthritis

Note on Transcription and Translation

The following transcriptions and translations are my own unless otherwise stated. In general, I have provided edited versions of my transcriptions in the main body of the text and more detailed transcriptions in the footnotes, using standard transcription conventions. To clarify:

- Script/colour changes: I have indicated script and/or colour changes (such as titles) with bold.
- Abbreviations: where I have supplied letters due to an abbreviation in the manuscript, I have indicated this by underlining the letters I have added.
- Corrections/insertions: I have used a back-slash and forward-slash to indicate the inserted/corrected material (e.g., \x/).
- Deletions: I have used brackets to indicate material that has been deleted (e.g., [x]).
- Accidental loss/damage: I have used angle-brackets to indicate the lost/damaged material (e.g., <…>), transcribing partially visible letters where possible.

Note on Figures

I have included images from manuscripts to illustrate the recipes in their original environment. Although the manuscripts involved in this dissertation are today located in three libraries, I have only used images from the manuscripts in the Stiftsbibliothek St Gallen because their digital facsimiles are the highest quality. Where possible, I have also provided figures of the pathologies considered in this dissertation, though images could not be provided in all cases.

Preface

Official declarations:

1. This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text.
2. It is not substantially the same as any that I have submitted, or, is being concurrently submitted for a degree or diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. I further state that no substantial part of my dissertation has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text.
3. It does not exceed the prescribed word limit for the relevant Degree Committee.

Word count: 79,501 words

Introduction

Chapter 1

A Dual Approach to Carolingian Medical Knowledge and Practice

Potio ad podagra que drachma calapodia
quem ego Terentianus accipi...[1]

So begins the seventeenth remedy in a recipe collection from Codex Sangallensis (hereafter csg.) 759, an early ninth-century manuscript containing a variety of medical texts. The recipe collection, covering pp. 58-94, includes 199 numbered entries, totalling 281 surviving recipes; the remedy in question, a potion intended to treat gout, is found on p. 60 (see Figure 1.1). These opening lines – 'I, Terentianus, have received [this medication]' – engage the reader and bring a personal dimension to early medieval health and medicine. Terentianus' autobiographical note speaks directly to the relationship between medical knowledge and practice during this period: his written record not only plays a critical role in the transmission of medical knowledge but testifies to his use of this body of knowledge in practice.

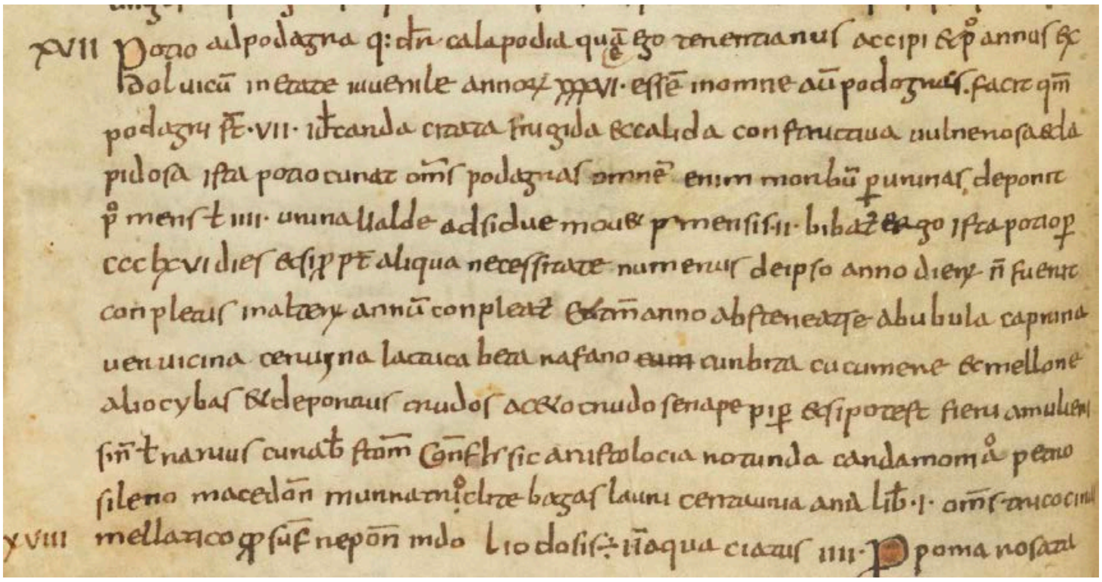

Figure 1.1: Potio ad podagra *(csg. 759, p. 60)*

[1] Stiftsbibliothek St Gallen, csg. 759, p. 60. See Chapter 2 for a full consideration of the manuscript sample examined in this dissertation.

Examining a sample of eighth- and ninth-century manuscripts, however, complicates this neat picture. Another early ninth-century manuscript located in St Gall, csg. 751, contains a nearly identical phrase at the start of an antidote for gout: *Antidotum podagricum quod dragma calipodium quod ego Terentius eo Ticianus accepi* (see Figure 1.2).[2] There are intriguing parallels between these two entries: both claim to treat gout, are from early ninth-century medical manuscripts located in St Gall, and were allegedly used by someone with the name Terenti(an)us. These features demand a closer look. Do the codicological contexts and manuscript histories of these two codices indicate that they were written by the same St Gall scribe, a certain Terenti(an)us? Or is there evidence to suggest that these manuscripts have different origins?

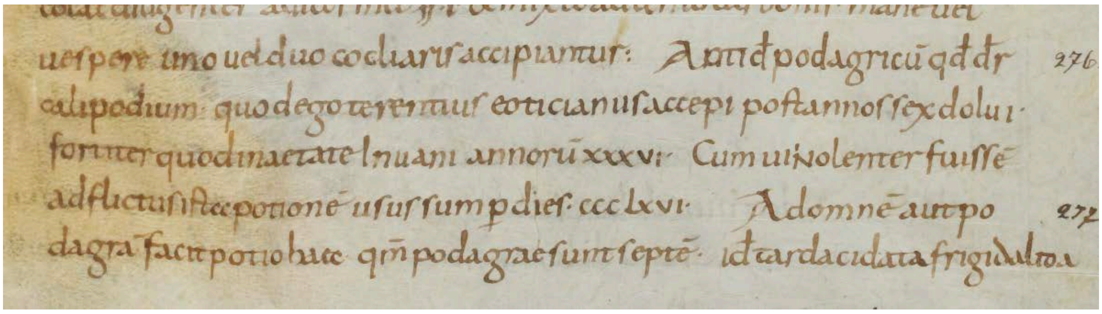

***Figure 1.2**: The start of the* Antidotum podagricum *(csg. 751, p. 489 (note: the antidote continues on p. 490))*

Textual analysis supports the latter option: an investigation into csg. 751 and 759 indicates that the remedies were not written by a single individual. First, it is unlikely that either manuscript originated in St Gall, let alone in the same scriptorium. According to Bernhard Bischoff, csg. 751 was probably written at a northern Italian site, whereas csg. 759 was composed in Brittany.[3] While the well-documented movement of manuscripts and individuals during this period does not rule out that a scribe such as the hypothetical Terenti(an)us could have moved between scriptoria, the scripts employed in the two manuscripts are entirely unlike one another, suggesting

[2] Csg. 751, p. 489.
[3] B. Bischoff, Katalog der festländischen Handschriften des neunten Jahrhunderts (mit Ausnahme der wisigotischen), 3 vols (Stuttgart 1998), III, p. 332.

that different scribes were responsible for these compositions.[4] Csg. 751 is predominantly written in a regular, early Caroline hand, whereas csg. 759 contains a pre-Caroline script with insular influences. These features suggest that csg. 751 and 759 were composed in two different scriptoria and by two distinct scribes who copied the same source or similar exemplars.

Furthermore, the contexts in which these two treatments are situated also have significant differences. Although they are both located within collections of medical recipes, the differences between the two collections indicate that they are not based on the same exemplar. The collection in csg. 759 covers much of the second half of the manuscript, pp. 58-94, and is immediately preceded by an index on pp. 53-58 outlining its contents. The index lists 446 entries, but a large number of pages has been lost from the collection, such that only 199 entries survive. The *Potio ad podagra*, located on p. 60, is the seventeenth entry. In contrast, the collection in csg. 751 covers pp. 430-96 and, according to an index on pp. 424-28, contains 319 entries. The *Antidotum podagricum*, found on p. 489, corresponds to index entry 277. Therefore, despite containing certain individual entries with overlapping information, the two collections represent entirely distinct compilations.[5]

This example highlights some of the challenges of using textual evidence to explore the practice of medicine and its relationship to medical knowledge. At first glance, Terenti(an)us' seemingly personalised note appeared to provide a window into the use of the medical texts circulating during the Carolingian period, offering direct evidence for the application of the medical knowledge contained within these writings.

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[4] R. McKitterick, *The Carolingians and the Written Word* (Cambridge, 1989). On the movement of early medieval manuscripts with medical texts specifically, see F. E. Glaze, 'The perforated wall: the ownership and circulation of medical books in medieval Europe, ca. 800-1200', unpublished Ph.D. thesis, Duke University (1999), pp. 73-5, 92-8.

[5] It must also be noted that at least one additional example of a Terenti(an)us recipe survives: Ernest Wickersheimer recorded another version of the recipe, in this case listed as *Potio ad podagram quae dicitur calapodia quem ego terrentianus accepi*, in Paris Bibliothèque nationale de France (hereafter BnF) lat. 11219, a manuscript that was not analysed in this dissertation. See E. Wickersheimer, *Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France* (Paris, 1966), p. 116.

Yet, as this case demonstrates, an analysis of individual examples in isolation can easily lead to false conclusions. Since it is unclear who Terenti(an)us was and when he was writing, his commentary does not necessarily provide evidence of medical practice during the Carolingian period. I stress *necessarily* because this individual *could* be just a generation or two removed from the scribes responsible for these manuscripts and thus also represent Carolingian medicine; there is, however, no evidence to provide a specific date.

So, what do these recipes tell us? While they do shed light on certain aspects of the medical knowledge in circulation, they also indicate a) the dangers of drawing conclusions based on a limited textual sample and reading texts in isolation, and b) the challenge of understanding the relationship between medical knowledge and practice in this period. This dissertation seeks to address both of these issues. First, by transcribing and analysing 4335 recipes unattributed to classical and late antique sources, this study is grounded on a large and diverse sample of written material—and, notably, these types of recipes have generally been overlooked by previous scholarship. Secondly, by combining investigations into the practicality and applicability of this recipe literature, this dissertation casts fresh light on the relationship between medical knowledge and practice.

This chapter will first locate the dissertation within existing scholarship and flesh out its aims, explaining why this study is needed, how it will help to unpack certain problematic assumptions, and how it attempts to fill a gap in the field. I shall then outline the dual approach involved in this project, the joint focus on the practicality and applicability of the treatments recorded in eighth- and ninth-century manuscripts. Finally, the significance of situating this work within the Carolingian period will be detailed before providing a brief overview of the following chapters.

Finally, it is essential to define the two key concepts of practicality and applicability before considering the historiographical framework on which this dissertation is grounded. Regarding 'practicality', this study is interested in whether medical knowledge was practical with respect to both intention/design and use in medical practice. For example, in terms of intention/design, do collections of remedies contain user-friendly features suggesting that they were intended to be consulted? And in terms of use in the context of treatment, do the recipes themselves rely on ingredients that could have been obtained in the Carolingian world? The question of applicability, on the other hand, considers the health needs of individuals during this period, asking whether the conditions and symptoms described by the texts are reflected in the osteological evidence. In other words, did people in early medieval Europe suffer from any of the ailments for which the recipes claim to offer treatments? With these concepts in mind, it is possible to review the existing scholarship and delineate how the present study builds on and reacts to past research in this area.

Setting the scene: Situating this dissertation in the historiographical context

It is necessary to situate this dissertation's aims in relation to previous scholarship in the fields of early medieval history and the history of medicine in order to provide the rationale and conceptual framework underpinning this project. Although these two fields have historically lacked much in the way of academic crossovers and connections, a new wave of scholarship is helping to bridge this divide, as will be detailed below. In the following historiographical review, I shall address initial studies of early medieval medicine, the rehabilitation of this area of scholarship, and recent research. The particular way in which the study of early medieval medicine developed has resulted in this dissertation's selection of evidence and focus on the questions of practicality and applicability. Initial studies of early medieval medical writings (and their lasting effects) influenced the selection of textual evidence examined in the following chapters, the second phase of scholarship (a wave of revisionist approaches to the field) resulted in this study's investigation of practicality, and recent research determined the focus on applicability. In other words, the examination of the practicality of medical treatments recorded in texts is in reaction to previous work whereas the evaluation of their applicability is an attempt to fill a significant gap in the scholarship. This historiographical review will therefore also address how the key concepts of practicality and applicability have (or have not) been considered in previous work and why the present study is needed.

1. Early work on early medieval medicine—and its implications for this dissertation

Though historiographical trends are changing, scholars of the Carolingian world have been relatively slow to turn to the history of health and medicine. As Meg Leja has pointed out, perhaps Einhard's claim that Charlemagne did not listen to his physicians has coloured modern historians' approach to the topic: 'scholars have followed Einhard's lead—unconsciously or not—in discounting medicine as an important aspect of the Carolingian renaissance'.[6] Regardless of the underlying cause, the traditional view is that the realm of medicine was not strongly influenced by the Carolingian project of *correctio* and its associated return to classical texts.[7] Instead, it has been argued that the primary 'Carolingian achievement in medicine was to increase the volume of manuscript production'.[8] This disconnect between early medieval medicine and Carolingian reforms helps to explain why Loren MacKinney's *Early Medieval Medicine, with Special Reference to France and Chartres*—now over eighty years old—remains the only monograph on the topic.[9]

Historians of medicine, however, have been more active in the study of medical texts recorded in manuscripts from the eighth and ninth centuries. This has largely stemmed from an interest in tracing classical medical texts through early medieval copies and their related descendants.[10] Indeed, this approach to the texts reflects the

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[6] M. Leja, 'The Sacred Art: Medicine in the Carolingian Renaissance', *Viator* 47 (2016), 1-34, pp. 1-2.

[7] Vivian Nutton, for example, points out that very few classical texts were actually rediscovered during this period; V. Nutton, 'Early Medieval Medicine and Natural Science', in D. C. Lindberg and M. H. Shank (eds), *The Cambridge History of Science 2: Medieval Science* (Cambridge, 2013), 323-40, p. 336. See also Leja, 'The Sacred Art: Medicine in the Carolingian Renaissance', p. 2.

[8] P. Horden, 'What's Wrong with Early Medieval Medicine?', *Social History of Medicine*, 24 (2011), 5-25, p. 17.

[9] L. C. MacKinney, Early Medieval Medicine, with Special Reference to France and Chartres (Baltimore, 1937).

[10] To cite but one example, see the extensive work that has gone into tracing the early medieval descendants of Pliny's *Natural History*, the *Medicina* and *Physica Plinii*: *Plinii Secundi Iunioris qui feruntur de medicina libri tres*, ed. A. Önnerfors, Corpus Medicorum Latinorum III (Berlin, 1964); *Physica Plinii Bambergensis (Cod. Bamb. Med. 2, fol. 93^{v}-232^{r})*, ed. A. Önnerfors (Hildesheim, 1975); A. Doody, 'Authority and Authorship in the

important role played by classical medical texts during this period and suggests that, in contrast to the traditional view noted above, medical writings directly 'intersected with the project of the Carolingian *correctio*'.[11] While a new understanding of medicine's place in the Carolingian renaissance will be addressed below, it is important to consider the full ramifications of the earliest phase of scholarship, and specifically the impact of a teleological approach to medical history. Seeing the trajectory of medicine as one of inevitable progress, scholars of the nineteenth and early twentieth centuries were largely dismissive of medicine in the early middle ages, seeing it as a period when medical knowledge and practice stagnated, if not retrogressed. Charles Singer's scathing comments epitomise this highly negative, disdainful approach to the texts: in 'A Review of the Medical Literature of the Dark Ages', he compares remedies in Old English medical writings to the potion produced by the witches in Macbeth and labels certain material as 'absurd and childish'.[12]

As a result of the condescension of early historians of medicine and the lack of engagement on the part of historians of the Carolingian world, the subfield of early medieval medical history is less developed than many other comparable subfields in both Carolingian history (consider, for example, the extensive studies of legal texts or liturgical writings) and medical history (similarly, consider the body of scholarship on classical or later medieval medicine).[13] This, in turn, has meant that the important work

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Medicina Plinii', in L. Taub and A. Doody (eds), *Authorial Voices in Greco-Roman Technical Writing* (Trier, 2009), 93-105; A. Doody, *Pliny's Encyclopedia: The Reception of the Natural History* (Cambridge, 2010).

[11] Leja, 'The Sacred Art', p. 3.

[12] C. Singer, 'A Review of the Medical Literature of the Dark Ages, with a New Text of about 1110', *Proceedings of the Royal Society of Medicine* 10 (1917), 107-60, see pp. 158-60. Similar views are espoused in J. H. G. Grattan and C. Singer, *Anglo-Saxon Magic and Medicine: Illustrated Specially from the Semi-Pagan Text* Lacnunga (Oxford, 1952).

[13] For an overview of Carolingian history, see, for example, M. Costambeys, M. Innes, and S. MacLean, *The Carolingian World* (Cambridge, 2014); R. McKitterick (ed.), *The Cambridge New Medieval History* II, *c. 700-c. 900*, (Cambridge, 1995); R. McKitterick, *The Frankish Kingdoms under the Carolingians 751-987* (London, 1983); R. McKitterick, *Charlemagne: The Formation of a European Identity* (Cambridge, 2008). For an overview of history of medicine (and the relatively limited space given to early medieval medicine), see L. I. Conrad, M. Neve, V. Nutton, R. Porter, and A. Wear (eds), *The Western Medical Tradition: 800 BC to AD 1800* (Cambridge, 1995); for medicine in the ancient world, see V.

of transcribing, editing, and translating texts continues to be necessary.[14] Yet, as Faith Wallis has noted, the emphasis on producing editions of texts appears to have slowed the development of the field due to a number of ‘unexamined assumptions about texts that editing reinforces’, such as the idea that texts are stable constructs that maintain ‘a specific and definitive form from manuscript to manuscript’ or the assumption that ‘there is a single author whose intentions the editor can intuit’.[15] Therefore, although scholars such as Klaus-Dietrich Fischer or Arsenio Ferraces Rodríguez have made valuable contributions to the field by their publications of editions of texts and studies of the transmission of knowledge, their work has generally focused on tracing a single source or family of texts.[16] Ultimately, this type of philological approach is problematic as it tends to a) concentrate on particular texts in isolation and divorced from their manuscript context, and b) prioritise writings that can be linked to a known classical or late antique tradition. Such studies thus run the risk of the Terenti(an)us example, fail to consider the full codicological environment in which the text in question is found (an environment which may contain important insights into the text's

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Nutton, *Ancient Medicine* (London, 2004); and for later medieval medicine, see N. Siraisi, *Medieval and Early Renaissance Medicine: An Introduction to Knowledge and Practice* (London, 1990); M. R. McVaugh, *Medicine before the Plague: Practitioners and their Patients in the Crown of Aragon, 1285-1345* (Cambridge, 2002); M. R. McVaugh, *The Rational Surgery of the Middle Ages* (Florence, 2006); and P. D. Mitchell, *Medicine in the Crusades: Warfare, Wounds, and the Medieval Surgeon* (Cambridge, 2004).

14 M. H. Green, ‘Bodies, Gender, Health, Disease: Recent Work on Medieval Women's Medicine’, *Studies in Medieval and Renaissance History* 2 (2005), 1-46, pp. 2-3.

15 F. Wallis, ‘The Experience of the Book: Manuscripts, Texts, and the Role of Epistemology in Early Medieval Medicine’, in D. G. Bates (ed.), *Knowledge and the Scholarly Medical Traditions* (Cambridge, 1995), 101-26, p. 102.

16 Ars medicinalis de animalibus, ed. A. Ferraces Rodríguez (Santiago de Compostela, 2017); Curae quae ex hominibus atque animalibus fiunt, ed. A. Ferraces Rodríguez (Santiago de Compostela, 2015); Sorani quae feruntur Quaestiones medicinales. Lateinischer Text beider Versionen mit deutscher Übersetzung und Anmerkungen, ed. K.-D. Fischer (Cuenca, 2017). For a list of editions, see G. Sabbah, P.-P. Corsetti, and K.-D. Fischer, Bibliographie des textes médicaux latins: Antiquité et haut Moyen Age (Saint-Étienne, 1987) and K.-D. Fischer, Bibliographie des textes médicaux latins: Antiquité et haut Moyen Age: premier supplément (Saint-Étienne, 2000).

intended use(s)), and overlook so-called 'miscellaneous' medical writings.[17] In reaction to this traditional approach to the written record, this dissertation deliberately concentrates on a large sample of recipes unattributed to earlier sources.[18] These recipes (and the manuscripts in which they are found) will be reviewed in Chapter 2. In short, the textual evidence on which this dissertation focuses was selected in response to the way in which the study of early medieval medical history developed.

2. THE REHABILITATION OF THE STUDY OF EARLY MEDIEVAL MEDICINE—AND ITS IMPLICATIONS FOR THIS DISSERTATION

Although the initial studies of early medieval medicine were generally defined by their derision of and disdain for the state of medical knowledge in this period, a handful of researchers, such as Henry Sigerist and Loren MacKinney, were notable exceptions. These scholars took a more sympathetic approach to the field, attempting to consider early medieval medicine in context rather than through the lens of modern medicine.[19] Their pioneering studies lay the groundwork for a significant swing of the

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[17] See Augusto Beccaria's catalogue for a list of 'miscellaneous' medical material, including recipes, extracts, dietary notes, etc. A. Beccaria, *I Codici di medicina del periodo presalernitano* (Rome, 1956).

[18] It is important to note, however, that there has been a shift towards more varied approaches to the texts and a greater focus on the manuscripts themselves in recent decades. Carine van Rhijn's work on studying medical writings in their manuscript contexts (in her case, Carolingian priests' handbooks), for example, exemplifies this trend; A. C. van Rhijn and S. Patzold, *Men in the Middle - Local Priests in Early Medieval Europe* (Berlin, 2016); A. C. van Rhijn, 'Pastoral care and prognostics in the Carolingian period - The case of El Escorial, Real Biblioteca di San Lorenzo, L III 8', *Revue Bénédictine* 127 (2017), 272-97. This change in the textual analysis of early medieval medical writings relates to wider developments in the field reflecting the greater emphasis placed on investigating how a manuscript's composition and structure may provide insights into its purpose and users. For parallels, see, for example, the recent work of Alice Rio on legal collections or Rosamond McKitterick on historical writing, glossaries, and their textual environments, A. Rio, *Legal Practice and the Written Word in the Early Middle Ages: Frankish Formulae, c. 500-1000* (Cambridge, 2009); E. Kwakkel, R. McKitterick, and R. Thomson, *Turning Over a New Leaf: Change and Development in the Medieval Manuscript* (Leiden, 2012).

[19] See, for example, MacKinney, *Early Medieval Medicine*; H. E. Sigerist, *Studien und Texte zur frühmittelalterlichen Rezeptliteratur* (Leipzig, 1923); H. E. Sigerist, 'A Summer of Research in European Libraries', *Bulletin of the Institute of the History of Medicine*, 2 (1934), 559-610; H. E. Sigerist, 'The Latin Medical Literature of the Early Middle Ages',

historiographical pendulum: a wave of revisionist scholarship since the 1960s, led by historians such as Jerry Stannard, John M. Riddle, and Linda Ehrsam Voigts, effectively countered the outdated attitudes of the early studies in the field.[20]

Much of the research that challenged the traditional stereotypes of medieval medicine focused on practical elements in the texts, arguing that the written record was neither static nor ill-suited to contemporary use in medical practice. Voigts, for example, was among the first to draw attention to adaptations in early medieval recipe literature that appear to relate to the environments in which the texts were produced—in her case, the British Isles.[21] Maria Amalia D'Aronco and Anne Van Arsdall have continued to address the potential practicality of the Old English medical texts, and especially with reference to the transmission of knowledge, both textual and visual.[22] Although their work has concentrated on insular sources, the Old English texts have many significant parallels to the continental material considered in this dissertation,

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Journal of the History of Medicine, 13 (1958), 127-45; and J. Jörimann, *Frühmittelalterliche Rezeptarien* (Zurich, 1925).

[20] See, for example, J. M. Riddle, 'The Introduction and Use of Eastern Drugs in the Early Middle Ages', *Sudhoffs Archiv für Geschichte der Medizin und der Naturwissenschaften* 49 (1965), 185-98; J. M. Riddle, 'Theory and Practice in Medieval Medicine', *Viator*, 5 (1974), 157-84; J. M. Riddle, 'Pseudo-Dioscorides' *Ex herbis femininis* and Early Medieval Medical Botany', *Journal of the History of Biology*, 14 (1981), 43-81; J. Stannard, *Herbs and Herbalism in the Middle Ages and Renaissance* (Aldershot, 1999); L. E. Voigts, 'The Significance of the Name Apuleius to the *Herbarium Apulei*', *Bulletin of the History of Medicine* 52 (1978), 214-227; and L. E. Voigts, 'Anglo-Saxon Plant Remedies and the Anglo-Saxons', *Isis* 70 (1979), 250-68.

[21] Voigts, 'Anglo-Saxon Plant Remedies and the Anglo-Saxons'.

[22] M. A. D'Aronco, 'Anglo-Saxon Plant Pharmacy and the Latin Medical Tradition', in C. P. Biggam (ed.), *From Earth to Art: The Many Aspects of the Plant World in Anglo-Saxon England* (Amsterdam, 2003), 133-52; M. A. D'Aronco, 'The Transmission of Medical Knowledge in Anglo-Saxon England: The Voices of Manuscripts' in P. Lendinara, L. Lazzari, and M. A. D'Aronco (eds), *Form and Content of Instruction in Anglo-Saxon England in Light of Contemporary Manuscript Evidence* (Turnhout, 2007), 35-58; A. Van Arsdall, *Medieval Herbal Remedies: The Old English Herbarium and Anglo-Saxon Medicine* (New York, 2002); and A. Van Arsdall, 'The Transmission of Knowledge in Early Medieval Medical Texts: An Exploration', in F. E. Glaze and B. K. Nance (eds), *Between Text and Patient: The Medical Enterprise in Medieval and Early Modern Europe* (Florence, 2011), 201-15. On medieval herbals more generally, see M. Collins, *Medieval Herbals: The Illustrated Traditions* (London, 2000).

making these studies highly relevant to the present study with respect to the question of the practicality.

Research in this second wave of scholarship has taken a number of other approaches to the question of practicality, as well. John Riddle, for example, considered the presence of exotic ingredients in recipe collections, arguing that the evidence for the introduction of these substances testified to 'the definite use of the recipe literature and the importation of eastern drugs'.[23] Similarly, Michael McCormick suggested that certain aspects of the recipe literature document the fact that these treatments were written with the intention of being used in medical practice: in addition to highlighting the arrival of exotic substances, he notes the inclusion of a vernacular unit of measurement, *staupus*, in remedies from the *Lorscher Arzneibuch*.[24] Some researchers have even explored the potential efficacy of early medieval recipes, considering the role of the placebo effect and testing whether a selection of herbal recipes worked.[25]

While these types of studies have suggested that medical texts could have been used in the practice of medicine, the revisionist approaches to the field have, at times, been overly positivist in their reading of the evidence. Both Riddle's and McCormick's analyses, for example, were based on small sample sizes: Riddle used only the transcriptions of recipes from csg. 44 provided by Sigerist's early study while

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[23] J. M. Riddle, 'The Introduction and Use of Eastern Drugs in the Early Middle Ages', pp. 194-5.

[24] M. McCormick, Origins of the European Economy: Communications and Commerce AD 300-900 (Cambridge, 2002), p. 713. On the Lorscher Arzneibuch, Bamberg Staatsbibliothek Msc. Med. 1, see Das Lorscher Arzneibuch, ed. and trans. U. Stoll, Das Lorscher Arzneibuch: Ein medizinisches Kompendium des 8. Jahrhunderts (Codex Bambergensis Medicinalis 1): Text, Übersetzung und Fachglossar (Stuttgart, 1992).

[25] B. Brennessel, M. D. C. Drout, and R. Gravel, 'A Reassessment of the Efficacy of Anglo-Saxon Medicine', *Anglo-Saxon England* 34 (2005), 183-95; F. Harrison, A. E. L. Roberts, R. Gabrilska, et al., 'A 1,000-Year-Old Antimicrobial Remedy with Antistaphylococcal Activity', *mBio* (2015), doi:10.1128/mBio.01129-15; J. M. Riddle, 'Research Procedures in Evaluating Medieval Medicine', in B. Bowers (ed.), *The Medieval Hospital and Medical Practice* (Aldershot, 2007), 3-17; A. Van Arsdall, 'Challenging the "Eye of Newt" Image of Medieval Medicine', in B. Bowers (ed.), *The Medieval Hospital and Medical Practice* (Aldershot, 2007), 195-206.

McCormick's comments were based exclusively on the *Lorscher Arzneibuch*.[26] My research on a much larger sample of recipe literature has revealed many further examples of the phenomena both scholars identified, in some cases strengthening their arguments and in other cases challenging their conclusions. In particular, their reliance on single manuscripts isolated their findings from the wider context into which they fit. As this dissertation will demonstrate, a more thorough contextualisation of the manuscript evidence has significant implications for the question of practicality.

Moreover, the complete overhaul of the field has resulted in the generation (and repetition) of new assumptions with respect to the use of medical texts in the practice of medicine. Anne Van Arsdall's arguments regarding the transmission of medical knowledge and existence of a shared 'thought collective' are built on the assumption that these texts were intended to be used in medical practice.[27] More specifically, Van Arsdall contends that, while recipe collections like herbals do not contain enough information to represent teaching texts, they do present sufficient knowledge regarding the practice of medicine to 'capture and transmit [it]…to another person engaged in the same activity'; she simultaneously acknowledges, however, that the texts preserve 'no clues…as to exactly how or in what context they were employed. In essence, these texts exist without much context that would help in understanding them'.[28] Overall, though her argument for understanding the use of these texts in light of the modern use of technical writings, such as cookbooks or instruction manuals, is convincing, it is also circular: 'if [herbals] do not by themselves transmit enough practical information to be successfully used, how should they be understood?'[29]

Based on the number of extant manuscripts from this period (Augusto Beccaria's catalogue of pre-Salernitan manuscripts contains roughly 150 codices), Van Arsdall also claims that 'their practical value to those involved with healing

[26] On Sigerist's transcription, see Sigerist, *Studien und Texte*, pp. 78-99.
[27] Van Arsdall, 'The Transmission of Knowledge in Early Medieval Medical Texts', pp. 201-15.
[28] Ibid, pp. 202-3.
[29] Ibid, p. 203.

cannot be denied'.[30] This is particularly problematic as a) the number of surviving manuscripts containing a certain genre of texts does not define how these texts were used, and b) manuscripts containing medical texts comprise a relatively small percentage of the total number of manuscripts surviving from this period.[31] It must be remembered that there is also evidence to suggest that some medical texts were, in fact, used for non-therapeutic purposes: a medical poem by Quintus Serenus, for example, appears to have been used to teach metre rather than medicine.[32]

Similarly problematic, the lack of theoretical writings, signs of wear and tear, the presence of glosses, and the size and shape of manuscripts have been frequently employed as indications of the use of these texts in the practice of medicine.[33] The dimensions and folds of several manuscripts containing recipes studied in this dissertation, such as Paris BnF lat. 11218 and csg. 217, have been interpreted as evidence of their use by physicians. In the case of Paris BnF lat. 11218, this small, rectangular manuscript dated to the late eighth or early ninth century contains a diverse collection of medical and pharmaceutical texts. Based on its proportions (23.2 cm x 13.3 cm) and lack of writings on medical theory, Beccaria describes it as having 'the appearance of a manual [intended] for practical use'.[34] While the portability of a manuscript does indicate that it could have travelled with ease—and thus accompanied a Carolingian *medicus*—its size cannot be conclusively linked to use in medical contexts. Small volumes may have been composed for many reasons entirely unrelated to their use in medical contexts. The dimensions of available parchment at the times that these codices were written, for example, may have been deciding factors in their

[30] Van Arsdall, 'The Transmission of Knowledge in Early Medieval Medical Texts', p. 210; Beccaria, *I Codici di medicina del periodo presalernitano*.
[31] According to Nutton, 'Out of roughly 9,000 codices surviving from the ninth century, barely 100 can be classed as medical'; see Nutton, 'Early Medieval Medicine and Natural Science', p. 336.
[32] Glaze, 'The perforated wall', p. 103; Quintus Serenus, *Liber medicinalis (Le livre de médecine)*, ed. and trans. R. Pépin (Paris, 1950).
[33] P. Horden, 'What's Wrong with Early Medieval Medicine?', pp. 10 and 16.
[34] Beccaria, *I Codici di medicina del periodo presalernitano*, p. 161: 'Il volume, che nelle proporzioni ha l'aspetto di un manuale per l'uso practico…'

final forms. The jump from portability to practicality, moreover, assumes much about how medicine was practised and imagines that a physician-figure would have needed a portable medical guide to assist in his or her practice. Furthermore, what does this say about medical manuscripts with larger folia? Would the use of wider or longer pieces of parchment suggest that these compendia were impractical?

Regarding glosses, consider, for example, those in csg. 878, Walahfrid Strabo's *vademecum*. On p. 333, a number of remedies have been glossed in Old High German, offering translations of many of the ingredients into the vernacular.[35] In mixed linguistic communities, this would have been a very practical addition for an individual who was less familiar with Latin. The glosses, however, date to the eleventh century and therefore cannot be used to comment on the Carolingian use of these texts. Looking to parallels in the insular world, Maria Amalia D'Aronco describes London, British Library (hereafter BL), Harley 585, a manuscript containing the *Lacnunga*, a copy of the *Old English Herbarium*, and other medical texts, as 'a complete manual for a physician's use', noting that it 'has the aspect of a manuscript intended for use, study, and/or reference'.[36] While its selection of texts do include many recipes and other writings related to therapy, it must be remembered that ' the extent to which their authors intended them for actual use' in the practice of medicine remains unknown—even in manuscripts that that appear 'decidedly practical in orientation'.[37] Furthermore, with respect to the glosses in London BL Harley 585, the 'comments that seem to derive from direct experience', i.e., those that most clearly connect the texts to the practice of medicine, have been dated to the fourteenth century.[38]

Finally, Peter Köpp describes csg. 217 as the *vademecum* of an early medieval physician and Clare Pilsworth builds on his assessment, writing that the manuscript's 'very practical orientation and simple decoration argue for some sort of practical use

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[35] E. von Steinmeyer and E. Sievers, *Die althochdeutschen Glossen*, 5 vols (Berlin, 1879), IV, p. 455.
[36] D'Aronco, 'The Transmission of Medical Knowledge in Anglo-Saxon England', p. 50.
[37] K. Park, 'Medicine and Society in Medieval Europe, 500-1500', in A. Wear (ed.), *Medicine in Society: Historical Essays* (Cambridge, 1992), 59-90, p. 66.
[38] Ibid, p. 52.

by a medical practitioner'.[39] Indeed, there are a number of elements that *could* suggest 'that it was carried around by a practicing *medicus*', including its a) shape, size, and folds, b) exclusive focus on recipes (herbal and animal) and texts on bloodletting, c) lack of writings on medical theory, d) other features of presentation (such as the decoration), and e) signs of wear and tear.[40] Yet Pilsworth provides an important note of caution, reflecting that 'this argument also presupposes…that [the manuscript] was only ever designed for one use or purpose, and that a learned interest in herbs and their origins could not be combined with their practical application'.[41]

In line with Pilsworth's suggestion that medical manuscripts could have had multiple purposes, Peregrine Horden has offered a particularly illuminating assessment of the question of use, noting a variety of ways that medical texts could have been used. Horden states that 'perhaps a common mistake in hoping to establish the *Sitz im Leben* of many medical manuscripts has been to…assume that the usefulness of medical texts lay only in therapy'.[42] He cites antiquarianism (though recognises that the 'simple preservation of a text for its own sake…should be automatically suspect'), prestige (that is, a luxury or display copy), and scholarship (i.e., as literary models or works of scientific information) as possible, non-therapeutic uses of medical writings.[43] Faith Wallis also links the arrangement of manuscripts to the context of education, connecting 'the transmission of texts through florilegia' to

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[39] P. Köpp, Vademecum eines frühmittelalterlichen Arztes: Die gefaltete lateinische Handschrift medizinischen Inhalts im Codex 217 und der Fragmentensammlung 1396 der Stiftsbibliothek in St. Gallen (Aarau, 1980), pp. 12-13; C. Pilsworth, Healthcare in Early Medieval Northern Italy: More to Life than Leeches? (Turnhout, 2014), p. 81.
[40] Leja, 'The Sacred Art', pp. 16-17.
[41] Pilsworth, *Healthcare in Early Medieval Northern Italy*, p. 81. Pilsworth extends the discussion of manuscripts' potential to be used in multiple ways based on her analysis of Modena, Archivio Capitolare, O.I.11 (see pp. 81-93), emphasizing that it could have been consulted as a guide to therapy as well as used for teaching or 'purely academic purposes' (p. 92).
[42] P. Horden, 'Prefatory Note: The Uses of Medical Manuscripts', in B. Zipser (ed.), *Medical Books in the Byzantine World* (Bologna, 2013), 1-6. See also Horden, 'What's Wrong with Early Medieval Medicine?', pp. 5-25.
[43] Horden, 'The Uses of Medical Manuscripts', pp. 1-6.

medical training.[44] Therefore, despite the previous work that has argued for the use of such manuscripts in the practice of medicine based on various practical elements, it is dangerous to assume that recipes were copied with the sole (or at least primary) intention of being used in this way. Moreover, the fact that so much of this research, especially with respect to the availability of ingredients or possible efficacy of treatments, has concentrated on Old English material demands an assessment of the continental recipe literature—that adaptations were made to suit insular conditions should not be taken as evidence that manuscripts composed in Carolingian scriptoria included similar modifications made in relation to their northern and/or Alpine environments.

Ultimately, the second wave of scholarship in the field of early medieval medicine has provided a crucial revision of earlier work and rehabilitated the study of this topic. This body of research has made it blindingly clear that Singer's assumptions about mindless and futile copying of medical material are wholly inaccurate. However, in the process of reclaiming the study of early medieval medicine, it has, at times, been overly positive in reading the evidence, automatically connecting evidence of use with use in therapeutic contexts. Consequently, this scholarship deserves a re-evaluation and the assumptions which it has often reinforced must be questioned. Regarding recipe literature specifically, the investigation of Carolingian material is particularly needed given the past concentration on Old English medical texts. This dissertation's assessment of the practicality of a sample of 4335 recipes from eighth- and ninth-century continental manuscripts is therefore a direct reaction to this second generation of scholarship and its lasting influence on the field.

3. Recent scholarship on and new directions in early medieval medicine—and their implications for this dissertation

Although some contemporary scholarship that has either continued or challenged earlier research has been mentioned above (namely, the work of Leja,

[44] Wallis, 'The Experience of the Book', p. 106.

D'Aronco, Van Arsdall, and Horden), a number of recent historiographical trends, and their implications for this dissertation, must be addressed in more detail.[45] As noted above, there has been a significant increase in the number of historians of early medieval Europe who either specialise in or integrate into their research the history of health and medicine. Early medieval medical history is now being productively connected to other subfields and a much wider discourse, ranging from cultural and political history to studies of the Carolingian renaissance.[46]

Among the most important historiographical developments, however, have been the related impulses to study history from below, diversify the types of evidence employed in historical analyses, and explore health as part of medical history. As Monica Green has noted, the history of medicine has traditionally taken a top-down approach: 'medical history was the history of practitioners…and only secondarily of patients'.[47] Shifting the focus of the history of medicine from practitioners to patients brings together the three trends noted above. In the case of this dissertation, that shift entails an examination of the lived experiences, and especially the experiences of injury and disease, of individuals in early medieval Europe. A study of health has the

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[45] Note: while the following section focuses on the significance of the investigation of health (i.e., the patients rather than the practitioners), I shall return to recent work from the perspective of Carolingian history in the section on 'The Carolingian context' below.
[46] For connections between different subfields of Carolingian history, see, for example, Leja, 'The Sacred Art'; Z. Mistry, *Abortion in the Early Middle Ages, c. 500-900* (Woodbridge, 2015), Z. Mistry, 'The womb of the Church: Uterine expulsion in the Early Middle Ages', in M. E. Couto-Ferreira and L. Verderame (eds), *Cultural Constructions of the Uterus in Pre-Modern Societies, Past and Present* (Newcastle, 2018), 150-69. For more focused assessments of health, medicine, and medical practitioners in early medieval Europe, see, for example, T. Newfield, 'The contours of disease and hunger in Carolingian and early Ottonian Europe (*c*. 750-950 CE)', unpublished PhD thesis, McGill University (2010); T. Newfield, 'Malaria and Malaria-like Disease in the Early Middle Ages', *Early Medieval Europe* 25 (2017), 251-300; Pilsworth, *Healthcare in Early Medieval Northern Italy*; and P. Skinner, *Health and Medicine in Early Medieval Southern Italy* (Leiden, 1997); and on the integration of medicine into the study of medieval history, see M. H. Green, 'Integrative Medicine: Incorporating Medicine and Health into the Canon of Medieval European History', *History Compass* 7 (2009), 1218-45.
[47] M. H. Green, 'Gendering the History of Women's Healthcare', *Gender & History* 20 (2008), 487-518, p. 492. See also Green's take on the history of health vs. the history of medicine: M. H. Green, ''History of Medicine' or 'History of Health'?', *Past and Future: The Magazine of the Institute of Historical Research* 9 (2011), 7-9.

potential to consider a wider cross section of society (including those beyond the elite, the small subset of the population who are generally recorded by the texts) and to incorporate a variety of types of evidence (including non-textual material).

Green and Robin Fleming have pioneered the study of medieval health using sources outside of the traditional textual corpus. While Green has united genetics with the study of health and disease, Fleming has turned to the osteological record 'to re-animate the historical dead'.[48] Fleming's studies of individuals in early medieval England has effectively demonstrated how evidence from skeletal remains can be used to enrich our understanding of the lived experiences of people in the middle ages, offering 'intimate details about the life and death' of individuals during this period, including information about their diet, living and working conditions, and experiences of injury and disease.[49] The possibility of assessing the health of people in early medieval Europe thus adds a new dimension when considering the practice of medicine, and especially the relationship between medical knowledge and practice. Building on Fleming's example, this dissertation will use osteological evidence to gain insights into the health of individuals in early medieval Europe, and then apply these insights to the recipe literature, asking if skeletal remains preserve evidence of the conditions recorded in the texts. In other words, were the treatments listed in eighth- and ninth-century manuscripts applicable to individuals in this period?

That this dissertation questions the applicability of recipe literature, i.e., the relevance of the texts to the medical needs of individuals in early medieval Europe, may cause some surprise: 'surely a remedy for gout has been preserved because people had gout?' Much scholarship has made this assumption. Take, for example, Vivian Nutton's comment on the content of early medieval medical manuscripts: 'most

[48] M. H. Green, 'Genetics as a Historicist Discipline: A New Player in Disease History', *Perspectives on History* 52 (2014), 30-1; M. H. Green (ed.), *Pandemic Disease in the Medieval World: Rethinking the Black Death* (Kalamazoo, MI, 2015); R. Fleming, 'Bones for Historians: Putting the Body Back into Biography', in D. Bates, J. Crick, and S. Hamilton (eds), *Writing Medieval Biography, 750-1250: Essays in Honour of Frank Barlow* (Woodbridge, 2006), 29-48 (note: quotation is from p. 29); and R. Fleming, 'Writing Biography at the Edge of History', *The American Historical Review* 114 (2009), 606-14.
[49] Fleming, 'Bones for Historians', p. 29.

medical manuscripts before 1100 are largely recipe lists, often well organized and well suited to the needs of the community'.[50] This statement assumes that the recipes correspond to the medical needs of individuals in early medieval Europe—but where is the evidence to support this claim? Many of the recipes analysed in this dissertation, though they are not directly attributable to classical and late antique writings, are related to this body of knowledge.[51] The influence of these classical medical traditions demands that we question this assumption because the climate, living conditions, and lifestyles of the Mediterranean world of antiquity and of ninth-century western Europe were different in many ways. As will be detailed in Chapter 6, these fundamental differences may have resulted in vastly altered experiences of disease, injury, and overall health between the original authors of the medical traditions and of the scribes responsible for the manuscripts involved in this project. The question of the text's relevance to contemporary individuals is therefore essential to investigate when studying the relationship between medical knowledge and practice, and new trends in the scholarship in recent decades have laid the groundwork for such an investigation.

Although Fleming could still speak of the 'non-relationship between historians and researchers in more scientific disciplines' in 2009, studies integrating archaeological evidence, including the osteological record, have increased in recent years.[52] Clare Pilsworth's chapter on diet and health within her study of healthcare in early medieval northern Italy represents one such example.[53] In her brief consideration of osteological evidence for joint conditions and fractures, Pilsworth hints at the possible 'mismatch between the emphasis given in a large late antique medical text, such as Caelius Aurelianus' work, and at least some of the chronic ailments suffered by much of the population', highlighting that an investigation into the applicability of

[50] Nutton, 'Early Medieval Medicine and Natural Science', p. 335.
[51] Peregrine Horden even writes: 'early medieval medicine is ancient medicine. It derives substantially from ancient sources' (Horden, 'What's Wrong with Early Medieval Medicine?', p. 19). While I agree that early medieval medicine is largely derived from classical and late antique material, Part 1 of this dissertation will investigate other sources and influences on the texts.
[52] Fleming, 'Writing Biography at the Edge of History', p. 614.
[53] Pilsworth, Healthcare in Early Medieval Northern Italy, pp. 47-72.

the written record is desperately needed.[54] Pilsworth also notes that, in studies of health, historians of medicine have tended to overlook joint disease (despite the fact that it is 'a mainstay of palaeopathological analysis')—Chapter 8 responds to this particular challenge and evaluates the applicability of recipes relating to joint disease in light of the evidence preserved in skeletal remains.[55]

Therefore, in reaction to the calls for historians to engage with a wider evidence base and consider questions of health alongside medicine, this dissertation uses osteological evidence to re-evaluate the texts. Furthermore, the lack of previous research on the potential applicability of the medical knowledge circulating during the Carolingian period represents a significant lacuna in the field that this project intends to fill. Like the assumptions regarding the practicality of medical manuscripts and the recipes they contain, the assumption that medical texts were, by their very nature, relevant and applicable to communities in early medieval Europe is highly problematic and unfounded. Unlike the case of practicality, however, which some scholars have questioned, the question of applicability is largely new for the field. Ultimately, this dissertation's combined focus on both practicality and applicability, analysis of previously overlooked textual material, and consideration of osteological evidence will enrich our understanding of health and medicine in the Carolingian world.

Outlining the dual approach of this dissertation

1. Overview of the evidence used in relation to the questions of practicality and applicability

The relationship between knowledge and practice defines this dissertation. Yet, as the opening example of Terenti(an)us indicated, moving from medical knowledge to medical practice, tends to be a highly complex process. The guiding questions of this project that consider the possible practicality and applicability of this knowledge bridge the knowledge-practice divide and provide new perspectives on the study of

[54] Ibid, p. 70. See pp. 68-71 for the section on joint diseases and fractures, 'Joint conditions and Fractures in the Osteo-Archaeological Evidence'.
[55] Ibid.

early medieval medicine. Based on the definitions of these concepts provided above, this dissertation asks, a) was the recorded medical knowledge practical? I.e., do recipes recommend ingredients that could have been sourced in Carolingian Europe? Do recipe collections contain user-friendly features suggestive of their application in medical practice? And b) is there a correlation, a connection, or any overlap between the medical issues recorded in the texts and those seen on skeletons dated to the same period? In other words, is there evidence to suggest that individuals in the early medieval west suffered from the conditions recorded in the texts? These guiding questions therefore concern the relationship between medical knowledge and practice in the Carolingian world, investigating whether it was possible that those individuals in possession of the recorded medical knowledge could have used the texts in an attempt to treat people during this period. The twin concepts of practicality and applicability thus provide the analytical framework for this dissertation and its use of evidence, with Part 1 a study of practicality and Part 2 an examination of applicability.

The textual evidence, as noted above, breaks away from the traditional focus on single texts, instead considering a large sample of recipes unattributed to classical and late antique traditions. Since these texts have rarely been studied, my research began with the manuscripts directly: I have identified and transcribed 4335 recipes from a sample of eighteen eighth- and ninth-century Latin manuscripts (the recipe literature and manuscript sample will be detailed in Chapter 2). The analysis of these remedies form the basis for both parts of the dissertation, though Part 2 also brings in osteological evidence to re-evaluate the texts in light of skeletal remains of individuals from early medieval Europe. By pursuing in-depth analyses of previously overlooked textual sources, this dissertation expands on the strong foundations provided by the scholarship discussed above while challenging assumptions concerning the practicality of recipes. Finally, by using the osteological record to inform our understanding of the texts, this dissertation considers the medical needs of individuals in early medieval Europe and investigates the question of applicability. This dual approach combined with the examination of a large sample of understudied material breaks new ground in the study of Carolingian medicine.

2. THE CAROLINGIAN CONTEXT

Before outlining the following chapters, it is essential to address the project's chronological framework. The dissertation's date range, covering the late eighth and ninth centuries (*c*. 775-900), has been selected primarily in relation to the manuscript evidence—the backbone of the dissertation, as delineated above. While the manuscripts themselves will be detailed in Chapter 2, there are several key features to note with respect to the selection of this timeframe. First, based on the surviving evidence, a burst of manuscript production followed the reforming legislation promulgated by Charlemagne's court in the late eighth and early ninth centuries; this flowering of scholarship can be seen across many genres of writing, and medicine is no exception.[56] While the resulting increase in manuscripts thus provided a large body of evidence for this dissertation, the selected dates are also underpinned by an analytical significance that relates more specifically to the intellectual environment of the Carolingian period.

Meg Leja has convincingly argued for understanding medical literature produced during this period within the framework of the Carolingian renaissance.[57] Building on Leja's analysis of the *Lorscher Arzneibuch*'s opening chapter on the justification of medicine, I argue that the recipe collections analysed in this dissertation display many features central to Carolingian intellectual culture, such as the legitimisation (or, to use Leja's term, sacralisation) of classical knowledge and a strong focus on the presentation and ordering of texts. It is therefore important to consider

[56] On the Carolingian Renaissance and increase in manuscript production and literacy, see, for example, G. Brown, 'Introduction: The Carolingian Renaissance', in R. McKitterick (ed.), *Carolingian Culture: Emulation and Innovation* (Cambridge, 1994), 1-51; R. McKitterick, *The Carolingians and the Written Word*; R. McKitterick, 'Eighth-century Foundations', in R. McKitterick (ed.), *The Cambridge New Medieval History* II, *c. 700-c. 900*, (Cambridge, 1995), 681-94; and R. McKitterick, 'The Carolingian Renaissance of Culture and Learning', in J. Story (ed.), *Charlemagne: Empire and Society* (Manchester, 2005), 151-66. On the extant medical manuscripts see Beccaria, *I Codici di medicina del periodo presalernitano* and Wickersheimer, *Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France*; on medical texts listed in Carolingian library catalogues, see Glaze, 'The perforated wall', pp. 268-71.
[57] Leja, 'The Sacred Art', pp. 1-34.

new medical compositions, including the collections of recipes analysed here, within the particular intellectual and cultural climate in which they were produced. Significantly, these collections, given their 'miscellaneous' nature, have no known exemplars or direct antecedents and, as will be argued in Part 1 of this dissertation, they represent a mixture of sources and provide evidence for the reorganisation, adaptation, and addition of medical knowledge—all elements that speak to active scriptoria engaging in complex processes of textual selection and composition and place these manuscripts squarely in the context of the Carolingian renaissance.

While the opening date for this study, *c.* 775, has been determined in relation to Charlemagne's early reforming capitularies (such as the Capitulary of Herstal, dated to 779), the end date, *c.* 900, was selected due to changes in the intellectual culture of medicine that can be first detected in the tenth century. Building on the increasing number of medical texts in circulation, scribes and scholars began to move in new directions. In particular, a growth in cathedral schools can be seen in France, with centres such as Laon, Chartres, and Rheims recorded as places of medical teaching.[58] Around the same period, sites in southern Italy, including Montecassino and Salerno, appear to have begun reintroducing more theoretical elements in their medical writings; while the existence of a tenth-century 'School of Salerno' continues to be debated, Florence Eliza Glaze's work on Cassinese and early Salernitan manuscripts has suggested that new impulses can be seen in the medical literature produced in this period.[59] Katherine Park also highlights that, starting in the tenth century, a basic

[58] L. C. MacKinney, 'Tenth-Century Medicine as Seen in the Historia of Richer of Rheims', *Bulletin of the Institute of the History of Medicine* 2 (1934), 347-75; Park, 'Medicine and Society in Medieval Europe, 500-1500', pp. 66-7; Nutton, 'Early Medieval Medicine and Natural Science', p. 337; F. E. Glaze, 'Master-Student Medical Dialogues: The Evidence of London Sloane 2839', in P. Lendinara, L. Lazzari, and M. A. D'Aronco (eds), *Form and Content of Instruction in Anglo-Saxon England in Light of Contemporary Manuscript Evidence* (Turnhout, 2007), 467-94.

[59] Wallis, 'The Experience of the Book', p. 119; F. E. Glaze, 'Gariopontus and the Salernitans: Textual Traditions in the Eleventh and Twelfth Centuries', in D. Jacquart and A. Paravicini Bagliani (eds), *La Collectio Salernitana di Salvatore De Renzi. Convegno internazionale, Università degli Studi di Salerno, 18-19 giugno 2007* (Florence, 2009), 149-90; regarding developments in Cassinese manuscripts, I have benefitted from hearing Glaze's papers at several conferences, including 'The Confluence of Latin, Byzantine, and

vocabulary began 'to emerge for distinguishing between different kinds of practitioners: physicians, surgeons, herbalists, bleeders, and appliers of leeches', reflecting further changes in the medical culture of the Latin west around the turn of the millennium.[60] Selecting *c*. 900 as the cut-off date for this dissertation therefore avoids overlapping with these new developments and centres the manuscript sample around the shared cultural and intellectual framework provided by the Carolingian renaissance.

3. Outline of the dissertation

As noted above, this dissertation is divided into two parts, aligning with my dual approach to the textual and osteological evidence. Parts 1 and 2 both consist of four chapters: one introductory chapter and three case study-based chapters. The dissertation ends with a concluding chapter that brings the results of both sections together.

Part one focuses on the textual evidence for practicality. Chapter 2 reviews the manuscripts studied in this project and existing evidence for early medieval medical practice. Chapters 3-5 then each highlight a different element of the textual analysis. Chapter 3 traces the appearance of beer and mead (specifically as *medus*) in medical contexts. The assimilation of these non-classical beverages in medical texts speaks to the active adaptation of the written record to meet local conditions. In contrast, Chapter 4 looks at the other end of the spectrum, turning to the introduction (or, in some cases, reintroduction) of pharmaceutical knowledge from the far east, such as the use of camphor, musk, and ambergris as ingredients. Remedies that include these types of exotic products highlight the dynamic nature of this body of knowledge in the Carolingian world and may reflect the practicality of these treatments—if only for a very restricted and elite clientele.

Arabic Pharmacy: Southern Italy c. 1050-1150 CE', a paper delivered at 'Drugs in the Medieval World (ca. 1050-ca.1400)' (King's College London, 7 December 2018).
[60] Park, 'Medicine and Society in Medieval Europe, 500-1500', p. 70.

While Chapters 3 and 4 concentrate on particular case studies of ingredients, Chapter 5 considers the collections of recipes as a whole. This large-scale analysis examines units of measurement, the inclusion of instructions for substituting ingredients, and the composition of recipe collections. These studies shed light on practical adaptations made to these texts as well as the sources for individual remedies, the transmission of knowledge, and the structure of recipe collections. The combination of specific case studies (Chapters 3 and 4) with an analysis of the bigger picture (Chapter 5) thus addresses the potential practicality of the sample of medical writings from a variety of perspectives, offering new insights into whether these recipes appear to have been intended for use in medical practice.

Part 2 brings together the textual and skeletal evidence to investigate the potential applicability of this body of knowledge. Chapter 6 introduces the process of evaluating the written record in light of osteological evidence, addressing key conceptual challenges, such as retrospective diagnosis, and outlining the analytical framework for the following case studies. Chapters 7-9 concentrate on different types of pathologies that have the potential to be recorded in skeletal remains, using palaeopathological reports from excavations of early medieval burials to re-evaluate the texts. More specifically, Chapter 7 concentrates on dental disease, Chapter 8 considers joint diseases, and Chapter 9 focuses on surgery and trauma.

Bringing together the two approaches, Chapter 10 assesses the findings from both parts of the dissertation. This chapter concludes with a final consideration of the practicality and applicability of the medical knowledge circulating during the Carolingian period, the relationship between medical knowledge and practice, and the question of whether these texts may have been used in the practice of medicine. Ultimately, the analyses of traditionally understudied textual sources, combined with the dissertation's dual approach, have resulted in the emergence of a more nuanced picture of early medieval health and medicine.

Part 1

Practicality

Chapter 2
An Introduction to the Manuscript Evidence

'Medical literature was not all practical,' writes Florence Eliza Glaze, offering the following example: 'after examining numerous manuscripts studded with Greek anatomical terminology, much of it hopelessly corrupt, it has become clear that in many cases, neither scribes nor readers had the critical linguistic skills to grasp appreciably the meaning of the material in hand, to unlock the obscurity of the Greek, and parse the texts before them'.[1] Not unlike Glaze's comments on the impractical nature of some of the texts she consulted, Faith Wallis questioned the utility of certain treatises on urine and pulse analysis, noting that corrupted passages changed the meaning of these texts and would have limited 'the usefulness of this information at the bedside'.[2] While the question of practicality underpins Part 1 of this dissertation, it is also important to reflect on its counterpart, impracticality. Following Chapter 1's review of scholarship that has highlighted practical elements in early medieval medical texts, the above examples serve as helpful cautions, reminding us of the potential dangers of overstressing signs of practicality in medical texts. However, the cases of impracticality raised by Glaze and Wallis—that is, examples of texts that would have been difficult or problematic to use in medical practice—do not focus on the recipe literature analysed in this dissertation. Do recipes also preserve examples of impracticality?

There is evidence to suggest that some recipes were difficult, if not impossible, to follow due to the challenge of procuring some ingredients. Writing from across the Channel, Cynehard, bishop of Winchester (d. *c*. 778), complained to Lull, bishop of Mainz (d. 786), that many exotic ingredients listed in medical texts 'are unknown to

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[1] Glaze, 'The perforated wall', pp. 5-6.
[2] F. Wallis, 'Signs and Senses: Diagnosis and Prognosis in Early Medieval Pulse and Urine Texts', *Social History of Medicine* 13 (2000), 265-78, p. 273.

us and difficult to come by', asking his continental colleague to send supplies.[3] Cynehard's complaint questions the usefulness of the recipe literature, or at least with respect to certain recipes, ingredients, and the contexts in which they were being consulted.

Although Cynehard's letter comes from beyond the Carolingian world, it has three significant implications for this dissertation. First, his complaint indicates that some communities in eighth-century England were unable to obtain all of the ingredients listed in recipes, and it is possible that communities in Carolingian Europe experienced similar difficulties. This lack of access would have made certain recipes unusable, at least in their recorded state; as the evidence of some Old English medical writings suggests, it is possible that they could have been adapted *in situ* by substituting unavailable ingredients for local products.[4] I shall return to the topic of exotic ingredients in Chapter 4, investigating the potential practicality of recipes in relation to their inclusion of non-local ingredients. Secondly, this passage reflects that Lull, situated in the middle of the Frankish Empire, may have had better access to foreign products, or at least that Cynehard expected (or hoped?) this was the case. Finally, the letter indicates that Cynehard was, in fact, consulting medical remedies listed in texts with the intention of preparing them. In the same letter, he also writes, 'if you should come into the possession of any books of secular learning unknown to us, for example, concerning medicines – of which we have a goodly quantity here…you might consider sharing them [with us]'.[5] This comment further displays his keen interest in manuscripts containing medical knowledge.

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[3] F. Wallis, *Medieval Medicine: A Reader* (Toronto, 2010), pp. 110-11; *Die Briefe des heiligen Bonifatius und Lullus*, ed. M. Tangl, *MGH Epistulae selectae* I (Berlin, 1916), Letter 114, p. 247 (see n. 5 for the text in Latin).

[4] Voigts, 'Anglo-Saxon Plant Remedies and the Anglo-Saxons', pp. 250-68.

[5] Wallis, Medieval Medicine, pp. 110-11; Die Briefe des heiligen Bonifatius und Lullus, MGH Epistulae selectae I, Letter 114, pp. 246-7: Et hoc petimus, si qua apud vos solamina nobis necessaria ignota, spiritalis quidem scientiae sive in libris antiquis, qui a nobis habentur, sive in aliis ecclesiasticis administrationibus, ut nobis libenter participare non negetis. Nec non et si quos saecularis scientiae libros nobis ignotos adepturi sitis, ut sunt de medicinalibus, quorum copia est aliqua apud nos, sed tamen [p]igmenta ultramarina, quae in eis scripta conperimus, ignota nobis sunt et difficilia adipiscendum, vel si qua in aliis

The third point is particularly noteworthy: Cynehard's comments provide direct evidence for the application of the medical knowledge recorded in the texts—or rather the *intention* to apply this knowledge in practice. As this chapter will show, examples of this kind of evidence, i.e., direct evidence linking medical texts and practice, are exceedingly rare. However, building on Cynehard's letter, I shall review additional sources that relate to medical practice and recipe literature to consider whether there is indirect evidence to support the practicality of recipes and their use in therapy. While the scholarship discussed in Chapter 1 emphasised features within medical texts (such as ingredient adaptation in Old English texts) or the manuscripts in which they are located (such as their size and shape) to argue for the practicality of this body of knowledge, Chapter 2 turns to sources beyond the medical literature, such as letters, charters, and other documentary evidence. With this wider context in mind, the rest of the chapter will then focus on the recipes themselves, providing an overview of recipe literature in general as well as the sample of manuscripts consulted in this dissertation.

Considering the question of practicality via indirect evidence

As showcased in Chapter 1, many of the studies that have argued for the practicality of medical texts are based on research into aspects of the texts and their manuscript contexts, ranging from the lack of theoretical writings and emphasis on therapeutics to the folds in a manuscript's folia and its potential portability. Yet, as Clare Pilsworth points out, 'an additional way to attempt to assess the degree to which such recipes…were at least commonly known if not used is to explore references to recipes and remedies in other genres of writing'.[6] Cynehard's letter exemplifies how writings outside of the canon of medical texts may also offer insights into medical practice. I shall therefore review an array of written sources that touch on the practice of medicine and/or relate to recipes to consider their implications for the question of

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quibuslibet negotiis vel speciebus nobis necessariis providetis, communicare dignemini, ut fecistis villosam mittendo.

[6] Pilsworth, Healthcare in Early Medieval Northern Italy, p. 76.

practicality. I shall concentrate on three intersecting areas: i) general evidence for the teaching and practice of medicine in the early middle ages (preceding, post-dating, and during the Carolingian period), ii) evidence concerning the environment (highlighting texts relating gardens as well as the *Plan of St Gall*), and c) evidence for practitioners.

1. Evidence for the teaching and practice of medicine in early medieval Europe

a) *Sixth- and seventh-century foundations*

Despite significant changes in the post-Roman world, certain continuities can be seen with the medical landscape of late antiquity, especially in centres that maintained connections with the Greek east, such as Ravenna. In terms of medical education, for example, it appears that there was some type of medical school in sixth- or seventh-century Ravenna following the classical and late antique model: a certain Agnellus, described as an *iatrosophista* and *archiatrus* ('professor of medicine' and 'chief court physician'), lectured on Galen's *De sectis*, the first book of the traditional Alexandrian syllabus.[7] The nature of this school, however, continues to be debated given the limited evidence testifying to its existence, and no other medical schools are known in the west until the rise of the School of Salerno around the turn of the millennium.[8] The suggestion that some translations of Greek medical texts into Latin occurred in sixth- or seventh-century Ravenna further suggests that the city represented an environment in which the educational traditions and medical learning

[7] Agnellus of Ravenna, *Lectures on Galen's 'De sectis'*, ed. and trans. D. O. Davies, L. G. Westerink, et al. (Buffalo, 1981); F. Wallis, *Medieval Medicine*, pp. 14-17. On medical activity in sixth- and seventh-century Ravenna, see Nutton, 'Early Medieval Medicine and Natural Science', p. 330; Wallis, 'The Experience of the Book', p. 114.

[8] On the debate surrounding the existence of a school of medicine in Ravenna at this time, see N. Everett, *The Alphabet of Galen: Pharmacy from Antiquity to the Middle Ages*, ed. and trans. N. Everett (Toronto, 2012), pp. 21-4. On charter evidence, see Pilsworth, *Healthcare in Early Medieval Northern Italy*, pp. 189-92 and T. S. Brown, *Gentlemen and Officers: Imperial Administration and Aristocratic Power in Byzantine Italy, AD 554-800* (Rome, 1984), p. 77.

of late antiquity and the Greek east intersected with the changing intellectual climate of the Latin west.[9]

Cassiodorus, a scholar and Roman civil servant in the Ostrogothic regime in Italy in the first half of the sixth century, presents another early example that provides insights into the intended use of medical texts. At Vivarium in southern Italy, a monastery he founded in his retirement, he advised the community to help the sick with medicines and with hope in God.[10] While he continued to employ basic Roman ideas of treatment and supported human intervention in matters of health, his involvement of God in the healing process points to an evolving medical landscape, and paved the way for the emphasis on the sacralisation of medicine in the Carolingian world.[11] As part of his *Institutiones*, a text designed to guide monks in their pursuit of both divine and secular learning, Cassiodorus recommended certain medical writings, specifying treatises that were accessible to a primarily Latin-speaking community and that he considered acceptable for a Christian audience. His brief list includes the *Herbal* of Dioscorides, Latin translations of Hippocrates and Galen, 'a certain anonymous work that has been collected from various authors', Caelius Aurelius' *Medicine*, and 'various other works…I have left to you'.[12] Yet for Cassiodorus writing in sixth-century southern Italy, not unlike his near contemporary Agnellus teaching in northern Italy, the study and practice of medicine was arguably much more closely

[9] Wallis, 'The Experience of the Book', p. 114.
[10] Cassiodorus, *Cassiodori Senatoris Institutiones*, ed. R. A. B. Mynors (Oxford, 1937), p. 78.
[11] Leja, 'The Sacred Art', pp. 1-34.
[12] Cassiodorus, Cassiodori Senatoris Institutiones, pp. 78-9: Quod si vobis non fuerit Graecarum litterarum nota facundia, in primis habetis Herbarium Dioscoridis, qui herbas agrorum mirabili proprietate disseruit atque depinxit; post haec legite Hippocratem atque Galienum Latina lingua conversos, id est Tharapeutica Galieni ad philosophum Glauconem destinata, et anonymum quendam, qui ex diversis auctoribus probatur esse collectus. Deinde Caeli Aureli de medicina et Hippocratis de herbis et curis diversosque alios medendi arte compositos, quos vobis in bibliothecae nostrae sinibus Deo auxiliante, dereliqui. Translation: Cassiodorus, Institutions of Divine and Secular Learning, trans. J. W. Halporn (Liverpool, 2004), p. 166. Cassiodorus' ambiguous phrasing when providing the titles, authors, or short descriptions of his selected works has puzzled modern historians attempting to study his suggestions and their transmission; see P. Courcelle, Late Latin Writers and their Greek Sources, trans. H. E. Wedeck (Cambridge, MA, 1969), p. 403.

linked to the cultural environment of the late antique Mediterranean world than to that of western Europe several centuries later.

While surviving Carolingian copies of the texts recommended by Cassiodorus as well as evidence from extant ninth-century library catalogues illustrate that these writings circulated in Carolingian Europe, they may not have been consulted in the way that Cassiodorus originally expected.[13] As was apparent in this chapter's opening example, the individuals consulting these texts may have encountered difficulties in obtaining the ingredients recommended by the recipes. Alternatively, the Latin or Latinised Greek medical vocabulary used in the writings recommended by Cassiodorus may have posed major challenges for speakers of Germanic vernaculars in the Frankish Empire. Finally, though the question of applicability will be considered in Part 2, the potential differences between Cassiodorus' healthscape and that of the Carolingian world (and especially more northern, western, or Alpine regions) must not be forgotten. Therefore, while the texts recommended by Cassiodorus appear to have remained central pieces within the medical literature of the following centuries, their continued existence and copying cannot be read as direct evidence for the continuation of their use in the way that Cassiodorus intended.

Ultimately, in the realm of medical study, the textual records left by Agnellus and Cassiodorus offer insights into the transition from late antiquity to the early middle ages while simultaneously contributing to that transition.

b) *Tenth century: Continuity or change?*

Moving to the tenth and eleventh centuries, I shall address the periods pre- and post-dating the Carolingian world before returning to the eighth and ninth centuries in the next section. In the two centuries following the end-date of this dissertation (*c.* 900), the use of medical texts, and specifically recipe literature, is clearly documented in letters exchanged among the ecclesiastical elite: the writings of Richer of Rheims

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[13] See Florence Eliza Glaze's table of all the mentions of medical texts in surviving early medieval library catalogues, Glaze, 'The perforated wall', pp. 268-91.

(d. after 998) or Fulbert of Chartres (d. 1028), for example, indicate that these texts were certainly studied and, at least in some cases, consulted to prepare medications.[14] In a letter to Bishop Adalbero of Laon, Fulbert writes that he is sending several medications to help treat Ebalus, Adalbero's secretary, who is suffering from an unnamed illness.[15] Fulbert specifically recommends consulting the *antidotaria* (books of antidotes) in Laon if Adalbero needs guidance on 'what these [medications] are good for and how to take or to administer them'.[16]

As discussed in Chapter 1, this dissertation's temporal bounds, *c*. 775-900, were chosen due to the impact of the Carolingian project of *correctio* on the intellectual culture of Europe in the late eighth and ninth centuries. By the tenth century, new developments are apparent in the study and practice of medicine, such as the rise of cathedral schools as centres of learning and the increase in theoretical texts in some sites in southern Italy. While these developments built on the foundations provided by the intellectual climate of the Carolingian renaissance—and especially the enormous growth in the production of medical texts—they represent a new phase in the history of medicine, and the comments of Richer of Rheims and Fulbert of Chartres should not, therefore, be assumed to reflect the ways in which Carolingian scribes, readers, and medical practitioners engaged with medical texts.

c) *Carolingian medicine*

With the general evidence for the study of medical texts preceding and following the years *c*. 775-900 in mind, it is possible to turn to the Carolingian period. Alcuin, Charlemagne's famed Northumbrian scholar, notes the presence of doctors at court, describing their entrance in a poem,

> 'Forthwith flock in the doctors, disciples of Hippocrates:

[14] Richer, *Histoire de France*, ed. R. Latouche, 2 vols (Paris, 1967), II, pp. 224-30; Fulbert of Chartres, *The Letters and Poems of Fulbert of Chartres*, trans. F. Behrends (Oxford, 1976), see, for example, Letters 24, 47, 48, and 71 (pp. 45-7, 83-4, 84-5, and 119-20, respectively).
[15] Fulbert of Chartres, *The Letters and Poems of Fulbert of Chartres*, Letter 47, pp. 83-4.
[16] Ibid.

> This one opens veins, this one mixes herbs in a pot,
> That one cooks up a poultice, another offers potions'.[17]

In this case, Alcuin notes what the *medici* do, but does not refer to any use of written sources.[18] While the use of medical texts in the context of teaching and therapy is, of course, possible (and, as noted in Chapter 1, Clare Pilsworth has suggested that some medical miscellanies, such as Modena, Archivio Capitolare, O.I.11, could have been used in teaching based on their selection and presentation of certain texts), Alcuin's verses do not provide information regarding the *medici*'s potential use of written sources.[19]

A letter exchanged between Pardulus of Laon (d. *c*. 865), and Hincmar of Rheims (d. 882) provides an example of ecclesiastical elites engaging with medicine in a very practical, hands-on way. In this document, Pardulus offers dietary advice to Hincmar, intending to rebalance his humours and restore his health. As part of his recommendation, he writes, 'when rising from table, one should take a measure of beans that have been thoroughly purged and cooked with very clear fat. Although according to the philosophers this is said to dull the senses, it is nonetheless believed to evacuate and dry out phlegm'.[20] While Pardulus does not comment on where he gained this medical knowledge, his references to philosophers, descriptions of dietetic approaches to finding humoral balance, and specific terminology (such as *hygeia*) suggest his familiarity with the types of writings circulating during this period.

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[17] Wallis, Medieval Medicine, p. 80; Alcuin, Carmina, 26, ed. E. Dümmler, MGH Poet. I (Berlin, 1881), p. 245: Accurrunt medici mox, Hippocratica secta: / Hic venas fundit, herbas hic miscet in olla, / Ille coquit pultes, alter sed pocula praefert.
[18] For additional comments on *medici* by Alcuin, see Alcuin, *Epistola*, 213, ed. E. Dümmler, *MGH Epp. kar. aevi*. II (Berlin, 1895), pp. 356-7.
[19] Pilsworth, *Healthcare in Early Medieval Northern Italy*, pp. 81-93; Horden, 'The Uses of Medical Manuscripts', pp. 1-6.
[20] Wallis, *Medieval Medicine*, pp. 111-12; J. J. Contreni, 'Masters and Medicine in Northern France in the Reign of Charles the Bald,' in M. Gibson and J. Nelson (eds), *Charles the Bald: Court and Kingdom. Papers based on a Colloquium held in London in April 1979* (2nd edn) (Aldershot, 1990), 267-82, p. 282: *In ultimo, antequam surgatur a mensa, faba purgatissima cum purissimo pingui ad mensuram decocta sumatur; quae licet secundum philosophos sensum obtundere dicatur, tamen phlegmata et deponere et exsiccare creditur*.

Pardulus' letter is thus *highly* suggestive that the recipe literature and other medical texts were studied with the intent of applying this knowledge in practice but, unlike Fulbert's letter cited above, does not provide direct evidence for this application.

Walahfrid Strabo's (d. 849) poem *Hortulus* provides a glimpse of the author's first-hand knowledge of gardening while also noting a variety of medical applications for many of the plants growing in his 'little garden'. Significantly, Walahfrid begins the poem with a comment on how he has learnt about gardening, listing his own physical experiences in the garden alongside the knowledge he has acquired from books and picked up from oral traditions:

> 'A quiet life has many rewards: not least of these is the joy that comes to him who devotes himself to the art they knew at Paestum, and learns the ancient skill of obscene Priapus – the joy that comes of devoting himself to a garden…This I have learnt not only from common opinion and searching about in old books, but from experience – experience of hard work and sacrifice of many days when I might have rested, but chose instead to labor'.[21]

Walahfrid's brief reference to book learning, however, refers only to his knowledge of gardening, rather than to his acquisition of the medical information that follows. His recording of remedies in this text and others (see the discussion of csg. 878 below) is, as with the case of Pardulus, particularly suggestive that he was well-versed in the medical texts circulating during this period.[22]

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[21] Walahfrid Strabo, *De cultura hortorum*, ed. E. Dümmler, *MGH Poet.* II (Berlin, 1884), pp. 335-49. The translation is from: Walahfrid Strabo, *Hortulus*, trans. R. Payne (Pittsburgh, 1966), pp. 24-5: *Plurima tranquillae cum sint insignia vitae, non minimum est, si quis Paestanae deditus artis noverit obsceni curas tractare Priapi…Haec non sola mihi patefecit opinio famae vulgaris, quaesita libris nec lectio priscis; sed labor et studium, quibus otia longa dierum Postposui, expertum rebus docuere probatis*.

[22] Voigts uses Walahfrid's comments in the *Hortulus* as evidence of his use of medical texts in the practice of medicine. Walahfrid's references to book learning, however, do not

Furthermore, the plants listed in the *Hortulus*, common herbs, vegetables, and flowers, such as sage, mint, fennel, poppy, iris, lily, and rose, appear frequently in medical texts. Indeed, there is an entire late antique treatise, *De herba vettonica liber*, dedicated to treatments based on the herb betony, one of the twenty-four plants listed by Walahfrid.[23] *Hortulus* represents one of a number of non-medical texts that address the cultivation of plants listed as ingredients in recipes, thereby offering a useful point of transition to the next section on 'environmental' evidence for the practice of medicine in the Carolingian world.

2. Evidence from the environment: Gardens and architecture

Textual evidence for the cultivation of plants in early medieval Europe, and especially in relation to the plants recorded as ingredients in recipes, has received considerable attention in recent years. In addition to Walahfrid's *Hortulus*, I shall highlight two other key documents providing evidence for the cultivation for medicinal plants, the *Capitulare de villis* and the *Plan of St Gall*.

The *Capitulare de villis*, a capitulary dated to the late eighth century, concerns the management of royal estates.[24] The seventy chapters of the text cover a wide range of topics, from the administration of justice to the care of horses and hounds. Land use is a central theme and the final chapter lists nearly one hundred plants to be cultivated in gardens, including seventeen of the plants recorded by Walahfrid (southernwood, celery, chervil, catmint, poppies, melon, clary sage, costmary, fennel, iris, lily, lovage, mint, pennyroyal, rose, rue, and sage).[25]

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explicitly confirm this. See Voigts, 'Anglo-Saxon Plant Remedies and the Anglo-Saxons', p. 268.

[23] Pseudo-Antonius Musa, *De herba vettonica liber*, ed. E. Howald and H. E. Sigerist, Corpus Medicorum Latinorum IV (Leipzig, 1927), 3-11. See Chapter 5 for an analysis of recipes related to this text.

[24] *Capitulare de villis*, ed. A. Boretius, *MGH Cap.* (Hanover, 1883), no. 32, pp. 90-1; H. R. Loyn and J. Percival, *The Reign of Charlemagne. Documents on Carolingian Government and Administration* (London 1975), pp. 64-73.

[25] Capitulare de villis, MGH Cap., p. 90: abrotanum, apium, cerfolium, neptam, papaver, pepones, sclareiam, costum, fenicolum, gladiolum, lilium, levisticum, mentam, puledium, rosas, rutam, and salviam.

The so-called *Plan of St. Gall*, csg. 1092, provides another perspective on the relationship between gardens and medicine in the Carolingian world.[26] While this manuscript, sent by the monks of Reichenau to Abbot Gozbert of St Gall (816-37), may look like an architectural blueprint, the diagram is now thought to represent an idealised vision of a monastic centre. The detailed drawing provides a wealth of information, specifying even the plants growing in the diagram's three gardens. One of these gardens is designed for the infirmary area of the site and lists sixteen plants. Of these sixteen plants, there is significant overlap with Walahfrid Strabo's *Hortulus* as well as the *Capitulare de villis*: while *Hortulus* mentions ten of the plants (costmary, fennel, iris, lily, lovage, mint, pennyroyal, rose, rue, and sage), the *Capitulare de villis* lists all sixteen. The additional six plants are: cumin, beans, fenugreek, rosemary, savory, and watercress.[27] Nicholas Everett has noted that the linking of these three texts is not a new phenomenon and that the significance made of these overlapping gardens has become a 'scholarly topos'.[28]

While Everett seems to suggest that these parallels have been repeatedly (and uncritically) emphasised in work on medicine in the Carolingian world, the importance of the combined documentary record is hard to overstate. Although texts on gardening may not directly comment on the application of the medical knowledge recorded by the manuscripts, or even on the practice of medicine itself, they do indicate that many of the plants recommended by medical texts were expected to be cultivated during this period and were thus locally available. Clare Pilsworth reminds us, however, that evidence for cultivation presented by normative sources, such as capitularies, and the

[26] Csg. 1092; for more scholarship on the Plan of St Gall, see B. Schedl, Der Plan von St. Gallen: Ein Modell europäischer Klosterkultur (Vienna, 2014) as well as W. Horn and E. Born, The Plan of St Gall: A Study of the Architecture and Economy of, and Life in, a Paradigmatic Carolingian Monastery, 3 vols (London, 1979).
[27] The plants are recorded as costo, feniculum, gladiola, lilium, lybisticum, menta, pulegio, rosa, ruta, saluia, cumino, fasiolum, fenugreca, rosmarino, sataregia, and sisimbria in csg. 1092.
[28] See N. Everett, 'The Manuscript Evidence for Pharmacy in the Early Middle Ages', in E. Screen and C. West (eds), *Writing the Early Medieval West* (Cambridge, 2018), 115-30, p. 125, n. 43.

model monastic complex depicted by the *Plan of St Gall*, must be read with caution: such gardens could be read as a 'wish list' and may not actually reflect the plants that were available to a typical Carolingian community.[29] This question of representativity is, however, helped by Walahfrid's comments on many of these plants in *Hortulus*, revealing the added significance of the intersections between these three texts: the fact that Walahfrid is familiar with and describes cultivating many of the medicinal plants listed in both the *Capitulare de villis* and *Plan of St Gall* suggests that these texts may have, in fact, documented Carolingian gardening practices in theory and practice.

Returning to the *Plan of St Gall*, the infirmary garden represents just part of the diagram's medical area. The *Plan* includes a bloodletting room, physician's quarters, and an infirmary, and even notes the presence of a storeroom for the drugs involved in treatment (*armarium pigmentorum*). That the diagram of an idealised monastery features spaces dedicated to medical practice is noteworthy, reflecting the centrality of medicine and the maintenance of good health within this community.[30] Yet, like so many of the examples above, this manuscript provides evidence supporting the practice of medicine without a direct comment on the use of medical texts *in* this practice. Was there a space for books in the infirmary or would medical texts have been located in the main library? The contexts of manuscript production and use will be addressed below in relation to the overview of the manuscript sample.

3. Evidence for practitioners

In addition to the references to *medici* discussed above, a number of researchers, such as Valerie Flint, Patricia Skinner, and Clare Pilsworth, have used a range of sources to highlight not only the existence of medical practitioners during the early medieval period but also their great diversity. The 'medical marketplace' would have included practitioners representing a variety of healing traditions and operating

[29] Pilsworth, Healthcare in Early Medieval Northern Italy, p. 76.
[30] The importance placed on health also complements the focus on diet and regimen seen in many monastic rules; see, for example, *RB 1980: The Rule of St. Benedict in Latin and English with Notes*, ed. and trans. T. Fry (Collegeville, Minnesota, 1981) and T. G. Kardong, *Saint Columban: His Life, Rule, and Legacy* (Collegeville, Minnesota, 2017).

at multiple levels of accessibility and/or affordability.[31] Skinner and Pilsworth, for example, have mined charters and legal texts to trace the appearance of *medici* in early medieval southern and northern Italy, respectively.[32] While their research has yielded a number of examples of individuals recorded as *medici*, this type of evidence offers little sense of their medical practice and whether it involved medical texts. Indeed, Skinner cautions that,

> 'The evidence we have for medical practitioners, almost all male, may not be truly representative of the pattern of healthcare…We cannot reconstruct a network of informal healthcare delivered by men and women in their communities without evidence of their activities, but we must remain alive to the possibility that they existed, and that the picture we build up from the surviving sources may be only a small part of the whole.'[33]

Although the charter evidence does not offer insights into the medical practices of *medici* or their possible use of texts in training or treatment, it does shed light on other aspects of their lives and experiences, such as their position in society and degree of literacy, that are typically lacking in the sources reviewed above.[34] In particular, the charters analysed by Skinner and Pilsworth document the high level of literacy among the *medici* in northern and southern Italy. It is possible, therefore, that these literate medical practitioners consulted medical writings during their education or as part of

[31] V. J. Flint, 'The Early Medieval Medicus, the Saint – and the Enchanter', *Social History of Medicine* 2 (1989), 127-45; Skinner, *Health and Medicine in Early Medieval Southern Italy*; Pilsworth, *Healthcare in Early Medieval Northern Italy*; and C. Pilsworth, 'Could you just sign this for me John? Doctors, charters and occupational identity in early medieval northern and central Italy', *Early Medieval Europe* 17 (2009), 363-88; Park, 'Medicine and Society in Medieval Europe, 500-1500', pp. 67-9.

[32] Skinner, Health and Medicine in Early Medieval Southern Italy; Pilsworth, Healthcare in Early Medieval Northern Italy, pp. 187-209.

[33] Skinner, Health and Medicine in Early Medieval Southern Italy, p. 83.

[34] Pilsworth, Healthcare in Early Medieval Northern Italy, p. 187.

their practice, though there is no direct evidence for this use of the texts. Moreover, it must be remembered that literate *medici* may have represented only a small percentage of the available practitioners during this period; consequently, their potential engagement with the medical literature in circulation may not be representative of the majority of healing traditions in early medieval Europe.

Overall, like the majority of the examples cited above in relation to medical practice in the Carolingian period, additional documentary evidence that records the existence of medical practitioners does not reveal a clear connection between medical knowledge and practice. The charter evidence does, however, show that many *medici* in early medieval Italy were literate, and this finding indicates that, if they had access to the texts, they could have read this material. Beyond this evidence for literacy, the charter evidence provides no direct signs that *medici* engaged with medical texts as teaching materials or in relation to practice in the Carolingian period.[35]

4. Summary

Ultimately, while past scholarship has uncovered evidence for a number of different ways to practise medicine and pursue healing in the Carolingian world, signs that medical texts were consulted in this practice tend to be more indirect and tangential. Although it may be tempting to extrapolate from the evidence presented in the writings of Cassiodorus, the plants depicted in the infirmary garden of the *Plan of St Gall*, or the comments of later authors, explicit evidence for the use of medical texts in practice, such as Cynehard's letter, is exceedingly rare. Furthermore, since Cynehard's complaint remains among the best examples of an attempt to base medical practice on the recipe literature, we must be careful not to overemphasise the evidence for practicality presented in Chapter 1: Cynehard's use of the texts appears to have had limited success due to the impractical nature of the ingredients listed in the recipes

[35] A sixth-century charter from Ravenna does describe a certain Leontius as *medici ab schola greca*, a *medicus* from the Greek school (and is a key phrase in the debate regarding the possible medical school in Ravenna; see n. 8 above), but this reference connecting a *medicus* with an educational background predates the temporal bounds of the present dissertation.

(that is, they were unobtainable in eighth-century Winchester). Part 1's consideration of the practicality of recipes, in terms of both intention/design and use, is therefore much-needed to reconcile the evidence for both practicality and impracticality.

Outlining the recipe literature

Roughly eighty codices containing medical texts have survived from the eighth and ninth centuries alone.[36] There is great variety in the types of medical writings preserved within these manuscripts, including works on pharmacy, diagnosis, dietetics and preventative medicine, surgery, and gynaecology.[37] As noted in Chapter 1, this dissertation focuses on recipes unattributed to classical and late antique sources. This selection was based in part on the relative lack of engagement with these types of recipes in past scholarship and in part on the volume of material available to study: as will be seen in the following chapters, the analysis of a very large sample of previously overlooked texts has produced both new *and* generalisable conclusions regarding the medical knowledge in circulation during this period.

Despite being unattributed to specific classical or late antique texts, it would be a mistake to view these recipes as unrelated to earlier medical writings. Much of the recipe literature analysed in this dissertation, though it does not represent a particular treatise or family of texts from antiquity, is ultimately derived from these sources. The collections of recipes reviewed below thus contain a blend of traditions, based largely—but, as my case studies will demonstrate, not exclusively—on classical and late antique material. The resulting mixture presents the ideal environment for exploring the evolution of medical knowledge and has the potential to capture both local and exotic influences on medical writings during this period (see Chapters 3 and 4). Before reviewing the recipes and recipe collections analysed in the following

[36] Beccaria, *I Codici di medicina del periodo presalernitano*. I shall address the manuscripts in more detail below.
[37] For a full breakdown of the genres of medical writing and number of texts associated with each during this period, see Wallis, 'The Experience of the Book', p. 112, n. 30.

chapters, it is therefore essential to summarise the classical traditions on which this genre of medical writing is built.

1. Classical and late antique influences: The foundations of early medieval recipe literature

Classical medical authors, including Hippocrates (*c*. 460-370 BC), Dioscorides (*c*. 40-90), Soranus (first/second century), Galen (*c*. 129-*c*. 216), and Celsus (second century), left an enormous legacy through their textual output.[38] Although many of the writings for which they are known have since been revealed to be spurious, the works attributed to these physicians nevertheless appear to have been perceived as authentic at the time. These texts covered a wide range of topics and genres, with many physicians producing collections of remedies. A number of authors lacking formal medical training, such as Pliny the Elder (23-79), also included medical advice, and specifically remedies, in their works.[39] Some texts, such as Dioscorides' *De materia medica*, took the form of herbals, or recipe collections ordered by ingredients, while others, like Soranus' *On Acute and Chronic Diseases*, were structured around conditions and symptoms.[40]

Late antique authors, including Oribasius (*c*. 320-400), Caelius Aurelianus (fl. *c*. 400), Marcellus of Bordeaux (fl. late fourth/early fifth centuries), Alexander of Tralles (*c*. 525-605), and Paul of Aegina (*c*. 625-90) expanded the vast corpus of medical knowledge they inherited.[41] In addition to composing their own texts, many physicians restructured, summarised, or translated existing medical writings. While

[38] V. Nutton, 'Roman Medicine, 250 BC to AD 200', in L. I. Conrad, M. Neve, V. Nutton, R. Porter, and A. Wear (eds), *The Western Medical Tradition: 800 BC to AD 1800* (Cambridge, 1995), 39-70, p. 60.
[39] Pliny, *Natural History*, trans. H. Rackham, W. H. S. Jones, and D. E. Eichholz, 10 vols (Cambridge, MA, 1938-63).
[40] Dioscorides, *De materia medica*, ed. and trans. L. Y. Beck (Hildesheim, 2005); although Soranus' work does not survive, Caelius Aurelianus produced a Latin translation in the fifth century, see Caelius Aurelianus, *On Acute Diseases and On Chronic Diseases*, ed. and trans. I. E. Drabkin (Chicago, 1950).
[41] Nutton, 'Early Medieval Medicine and Natural Science', pp. 327-8, 332-6; Glaze, 'The perforated wall', pp. 10-58.

these efforts were traditionally seen as a simple repackaging of earlier knowledge that resulted in the stagnation of medical progress, more recent research has viewed the work of late antique physicians as indicative of a flourishing environment for the study of medicine.[42] The reordering of texts, composition of commentaries on existing works, and translations of Greek writings into Latin suggests that late antique authors worked to make this body of knowledge more user-friendly: older texts were revised to produce more practical medical guidebooks.[43] The medical information recorded in Pliny's *Natural History*, for example, is scattered throughout the entire encyclopaedia. Anonymous compilers excerpted the medical sections and ordered the recipes *a capite ad calcem* (from head to toe), producing new texts now known as the *Medicina Plinii* and *Physica Plinii* in the fourth and sixth centuries, respectively.[44] The influences of other medical writings circulating at this time can also be seen in these compilations, testifying to the dynamic, evolving body of medical knowledge that developed during this period.

Based on the evidence of surviving manuscripts, late antique herbals represent a hugely significant category within recipe literature. These writings, following the model established by Dioscorides' *De materia medica* (and, in many cases, containing information derived from *De materia medica*), include texts such as *The Alphabet of Galen*, Pseudo-Antonius Musa's *De herba vettonica*, and Pseudo-Apuleius' *Herbarius*.[45] A group of late antique herbals and bestiaries (writings structured similarly to herbals, but with a concentration on animal-based products) have often been found transmitted together; these texts include the aforementioned *De herba*

[42] Nutton, *Ancient Medicine*, p. 300; J. Stannard, 'Marcellus of Bordeaux and the Beginnings of Medieval Materia Medica', *Pharmacy in History*, 15 (1973), 47-53; Glaze, 'The perforated wall', pp. 18-46.
[43] O. Temkin, The Double Face of Janus and Other Essays in the History of Medicine (Baltimore, 1977), p. 202.
[44] Doody, 'Authority and Authorship in the Medicina Plinii', pp. 93-105; Doody, Pliny's Encyclopedia; Plinii Secundi Iunioris qui feruntur de medicina libri tres; Physica Plinii Bambergensis (Cod. Bamb. Med. 2, fol. 93^{v}-232^{r}) (see Chapter 1, n. 10, for full citations).
[45] For more on the genre of herbals, see Collins, *Medieval Herbals*; for a recent edition of *De materia medica*, see Beck's edition and translation of Dioscorides, *De materia medica* (see n. 40 above for a full citation)

vettonica and *Herbarius* as well as Pseudo-Dioscorides' *Ex herbis femininis*, Sextus Placitus' *Liber medicinae ex animalibus, pecoribus et bestiis*, and the anonymous *De taxone liber*.[46] Gerhard Baader has labelled this collection of texts the *Herbariencorpus* and traces their connection to sixth- or seventh-century Ravenna, a centre already noted in relation to its possible school of medicine during this period.[47]

2. Recipes unattributed to earlier sources

As noted in Chapter 1, many of the traditional, philological approaches to medical texts have focused on creating typologies of known texts, using the medieval copies to trace the transmission of earlier writings. Carolingian copies of these texts have been particularly well studied since they often represent the earliest extant versions of the individual text (and/or text variants) in question. Editions of many of the writings listed above have been published and the ingredients contained within their recipes indexed.[48] There remain, however, thousands of remedies in early medieval manuscripts unattributed to classical or late antique traditions. Modern scholarship has tended to label these as 'miscellaneous' groups of remedies since they lack an obvious link to an earlier source.[49] The label of miscellaneity has left them largely ignored due to the preference given to texts falling into known traditions.[50] Yet

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[46] Voigts, 'The Significance of the Name Apuleius to the *Herbarium Apulei*', p. 215; Riddle, 'Pseudo-Dioscorides' *Ex herbis femininis* and Early Medieval Medical Botany', pp. 43-81.

[47] G. Baader, 'Die Anfange der medizinischen Ausbildung in Abendland bis 1100', *La scuola nell'occidente latino dell'alto medioevo*, 2 vols (Spoleto, 1972), *II*, 669-772.

[48] Consider, for example, the *Corpus Medicorum Latinorum* series, which has produced editions of the works of Celsus, Quintus Serenus, Marcellus, Caelius Aurelianus, and Anthimus as well as the *Medicina plinii* and *Herbariencorpus*. Recent editions apart from this series include Nicholas Everett's edition and translation of *The Alphabet of Galen* (Everett, *The Alphabet of Galen*). Regarding ingredients, see C. Opsomer, *Index de la pharmacopée du Ier au Xe siècle*, 2 vols (Hildesheim, 1989).

[49] See, for example, Beccaria's comments on texts and excerpts in a number of the manuscripts examined in this dissertation, including BnF lat. 6882A, *Biblioteca Apostolica Vaticana* (hereafter BAV) pal. lat. 1088, csg. 751, and csg. 878. For the descriptions of these particular manuscripts, see Beccaria, *I Codici di medicina del periodo presalernitano*, pp. 148-9, 313-16, 372-81, 391-3, respectively.

[50] A. Dorofeeva, 'Miscellanies, Christian Reform and Early Medieval Encyclopaedism: A Reconsideration of the Pre-Bestiary *Physiologus* Manuscripts', *Historical Research* 90 (2017), 665-82, see especially pp. 675-6; A. Dorofeeva, 'Strategies of Knowledge

it is precisely these unattributed and miscellaneous remedies that have the greatest potential to document new developments in early medieval medicine. Surveys at the beginning of my doctoral research, building on my study of the books of remedies of the *Lorscher Arzneibuch* in my MPhil, alerted me to this possibility.[51] The case studies pursued as part of this project have confirmed my hypotheses and will be discussed in detail in Chapters 3-5.

Within the project's manuscript sample, reviewed below, I have come across unattributed medical recipes in a variety of contexts and formats. Considering the range overall, I have classed them as belonging to three categories: a) individual notes or additions, b) small collections of recipes, and c) mixed medical collections. Regarding category (a), recipes can be found in the margins, inserted between texts, or incorporated into an individual word's entry in glossaries or *hermeneumata*.[52] Although these types of unattributed remedies are found in many manuscripts, their total contribution the recipe sample is minor given their isolated nature. Category (b) concerns small clusters or groups of recipes, perhaps covering the second half of a folio after the end of a previous text or representing a short, thematic collection over a handful of pages, such as a grouping of remedies for dental conditions. While these contain multiple recipes, this type of collection is relatively rare and thus, like the first category, recipes in category (b) do not reflect a large percentage of the recipe sample. The majority of the recipes involved in the present thesis come from the final category, what I have termed 'mixed medical collections', or MMCs.

I have defined an MMC as an extensive, indexed collection of recipes and other medical information that has yet to be attributed to an earlier source or classed as belonging to a particular family of texts. There are several important points here: first,

Organisation in Early Medieval Latin Glossary Miscellanies: The Example of Munich, Bayrische Staatsbibliothek, Clm 14388', in E. Screen and C. West (eds), *Writing the Early Medieval West* (Cambridge, 2018), 146-68.

[51] Bamberg, Staatsbibliothek, Msc. Med. 1; Stoll, *Das Lorscher Arzneibuch*.

[52] In medical contexts, *hermeneumata* represent very simple Latin-Greek dictionaries of the names of ingredients; the loosely alphabetised lists offer the Latin and Latinised-Greek terms for ingredients side-by-side. See also 'Vile scraps' in Pilsworth, *Healthcare in Early Medieval Northern Italy*, pp. 93-9.

these collections are not only preceded by detailed indices, but they also rarely deviate from the order outlined in these indices (though a significant exception will be addressed in Chapter 5). Secondly, all MMCs I have recorded represent large collections with at least one hundred entries listed in their indices, though they often contain from 300 to 500 entries.[53] This size puts the MMCs on a par with late antique collections of recipes, such as the *Medicina Plinii* and *Physica Plinii*. Finally, these are highly mixed collections. The recipes included within the texts cover the entire spectrum of diseases and conditions, from head pains to gout, while simultaneously documenting a variety of recipe styles, ranging from complex antidotes using exotic ingredients to single ingredient 'simples' based on garden plants. The texts, moreover, often include other medical information in addition to recipes, such as an excerpt on weights and measures or a dietetic calendar.

Traditionally, other terms have been used to describe these types of collections, including *antidotaria*, *receptaria*, recipe collections, etc., but each of these existing terms fails to capture the extent of the diversity contained within such collections. While the majority of the entries in an MMC are recipes, the aforementioned inclusion of material that belongs to other categories of medical writing, such as brief extracts or calendars, defies such a simple classification. Moreover, MMCs represent highly diverse collections in several respects: there is a great diversity of information contained *within* the collections (regarding recipe types, conditions targeted, etc.) as well as immense variation seen *between* different collections. This variety fits with the genre of medical writing as a whole: no two manuscripts from this period are identical and neither are the examples of MMCs analysed in this dissertation (though two related MMCs will be explored in more detail in Chapter 5).[54] The range exhibited by MMCs is suggestive of an active intellectual environment not so unlike the situation in late

[53] In some cases, the manuscripts have not survived in their entirety, meaning that while an index may record over 400 entries, only half of the collection is present today.
[54] Glaze, 'The perforated wall', pp. 1, 78-9; Horden, 'What's Wrong with Early Medieval Medicine?', p. 17; Leja, 'The Sacred Art', p. 4.

antiquity, where new ideas and strategies of organisation influenced older texts and traditions, adapting the existing body of knowledge to meet contemporary needs.

Catalogues of medical manuscripts have tended to isolate the non-recipe sections from their wider context, noting the appearance of, say, a guide to weights and measures, without considering it is as a component of the collection as a whole. While the identification and categorisation of a manuscript's individual components is, of course, the goal of a catalogue, the isolation of these different elements—without addressing the larger collection of which they are a part—ignores how the composition works as a unit, disregarding how the inclusion of such a wide range of medical information may have reflected the needs and interests of the early medieval compilers responsible for these collections. Information on weights and measures, for example, would be a practical text to have alongside recipes.

MMCs are, therefore, truly miscellaneous compilations: though they focus on recipes, they contain an assortment of related material. While the label 'recipe collections' oversimplifies these compositions, I suggest that it is also unhelpful to isolate their constituent parts without considering their relationship to the collection as a whole. The term 'miscellaneous', moreover, comes with baggage, having been used as a blanket description of texts unattributed to earlier sources. Given these issues with the existing terminology, I propose 'mixed medical collection' as it is a) suitably broad in its description of these types of texts, and b) dissociated from any negative, preconceived notions attached to 'miscellaneous'.[55] A simple change to the vocabulary used to describe these collections can more accurately capture their composition and would enable cataloguers and other scholars to address these collections in their entirety as well as their individual components: although it is important to recognise the constituent parts of a manuscript, it is also crucial to understand how they relate to each other.

[55] On the problems and challenges associated with existing terminology and methods of understanding the composition of early medieval medical manuscripts, see also Horden, 'What's Wrong with Early Medieval Medicine?', and Wallis, 'The Experience of the Book'.

3. Recipe literature: Form and format

First, a note must be made on the terms ‘remedy’ and ‘recipe’. By ‘remedy’, I mean instructions for the treatment of a condition (or multiple conditions), including, for example, prescriptions intended to treat a specific disease, antidotes tackling a host of different ailments, simples from a herbal tradition, etc. Some entries in MMCs as well as the information contained in marginal notes or unindexed small collections, however, fall into the broader category of ‘recipe’. Instructions for the preparation of composite ingredients, for example, can be found alongside remedies; while these may not specify a treatment, they still have a medical purpose. Moreover, some items, like composite ingredients, may have been used as components in remedies *and* as treatments themselves.[56] Given this overlap and the potential ambiguity regarding whether a composite ingredient could have represented a remedy, I have counted recipes rather than remedies when analysing the data in order to examine the broadest possible sample.

The information contained within recipes varies immensely. A cure-all antidote may claim to treat fifty different conditions, ranging from snake bites to gout, and record an equally long list of ingredients, including many exotic substances, necessary for its preparation. In contrast, a simple may target a single symptom, such as head pain or toothache, and rely primarily on one ingredient, possibly mixed with an emollient or liquifying agent. The differences between these two cases highlight three key features: a) the wide array of conditions targeted by recipes, b) the variation between treatment specificity (from panaceas to highly specific treatments), and c) the range of ingredients involved (in terms of both the number of ingredients listed and their origins).[57] Recipes also vary in the information they include: some provide detailed instructions for the preparation of the medication (including ingredient quantities or ratios) and guidance on administering treatment, whereas others list only

[56] C. Burridge, ‘Incense in Medicine: An Early Medieval Perspective’, *Early Medieval Europe* 28 (forthcoming, 2020).
[57] The specificity of treatments is central to the analysis involved in Part 2 and will be addressed in more detail in Chapter 6.

ingredients. While particular types of recipes, such as antidotes, are sometimes listed together (*antidotaria*), recipes covering the entire spectrum of presentation formats, treatments types, and ingredient ranges are often found alongside each other in an MMC.

Finally, like late antique recipe collections, each entry in an MMC should be viewed more as a chapter heading since it may include multiple recipes. When more than one recipe is listed under a single heading, they tend to be prefaced by *Item* (likewise). For the purposes of calculating the number of recipes in MMCs, I have counted recipes rather than numbered entries (the number of recipes in an MMC is therefore usually greater than the number of entries listed by its index). Building on this background to the recipe literature, it is now possible to address the sample of manuscripts from which the recipes have been transcribed.

The manuscript sample

Although individual recipes and MMCs are often found in medical 'miscellanies', 'anthologies', or 'handbooks', i.e., manuscripts containing material entirely related to medicine (and often especially focused on pharmacy), there are exceptions.[58] In some cases, medical writings are located in manuscripts that cover a range of topics, such as Paris Bnf lat. 13955, a codex that includes a wide assortment of texts primarily related to the liberal and mechanical arts (from excerpts of Boethius on music and geometry to Columella's *De re rustica*); medicine is a logical addition to this grouping and perhaps suggests that this manuscript was intended for educational purposes.[59] On the other hand, 'the cohabitation of texts within the same covers was not always governed by transparent criteria' and medical texts can be found in

[58] Wallis, 'The Experience of the Book', pp. 101-26, see especially pp. 105-8; Wallis, 'Signs and Senses, p. 266; Horden, 'What's Wrong with Early Medieval Medicine?', pp. 16-19. Medical anthologies and handbooks will be considered below in relation to the context of manuscript production.

[59] Paris BnF lat. 13955; Bischoff, Katalog der festländischen Handschriften, III, p. 214; Beccaria, I Codici di medicina del periodo presalernitano, p. 176; Wickersheimer, Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France, pp. 128-34.

somewhat surprising contexts.[60] Consider, for example, csg. 44, the first half of which is a bible, whereas the second half contains a diverse collection of medical texts. Csg. 44 represents a composite manuscript, that is, the two halves were originally independent codices and they were bound together at a later date.[61]

I transcribed and analysed recipes from a sample of eighteen manuscripts.[62] These manuscripts are today located in the Stiftsbibliothek St Gallen (eight manuscripts), Bibliothèque nationale de France (six manuscripts), and Biblioteca Apostolica Vaticana (four manuscripts), three libraries with major collections of early medieval manuscripts and charters. Even more significantly for this project, within their collections, they each contain among the largest concentrations of early medieval manuscripts with medical writings. This manuscript selection includes texts written at scriptoria around the Frankish Empire and dated from the late eighth to the end of the ninth centuries, thereby providing a diverse sample of Carolingian manuscripts. I shall review the eighteen manuscripts before addressing their representativity and contexts of production.

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[60] Wallis, 'The Experience of the Book', p. 105.
[61] Csg. 44; Beccaria, I Codici di medicina del periodo presalernitano, pp. 364-8; Bischoff, Katalog der festländischen Handschriften, III, p. 301.
[62] Note: Two manuscripts initially included in the study have since been discarded from the sample. First, BAV reg. lat. 846, a ninth-century manuscript containing a collection of medical writings on ff. 109va-114^{vb}, was complicated by the heavy use of Tironian notes. For more on this manuscript, see Paris BAV reg. lat. 846; Beccaria, *I Codici di medicina del periodo presalernitano*, pp. 318-19; Bischoff, *Katalog der festländischen Handschriften*, III, p. 436; W. Schmitz, *Miscellanea Tironiana aus dem cod. Vaticanus lat. Reginae Christinae 846 (fol. 99-114)* (Leipzig, 1896). I also removed Paris BnF lat. 13403 from the manuscript sample due to its poor preservation. This codex, produced in the first half of the ninth century, is largely illegible and I could not transcribe enough material to record a single complete recipe. For more on this manuscript, see Paris BnF lat. 13403; Bischoff, *Katalog der festländischen Handschriften*, III, p. 210; Beccaria, *I Codici di medicina del periodo presalernitano*, p. 175; Wickersheimer does provide a partial transcription, see *Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France*, p. 127.

1. STIFTSBIBLIOTHEK ST GALLEN[63]

a) *Csg. 44*

Csg. 44 is a composite manuscript made up of two distinct halves: a bible given to St Gall in *c*. 780 covers pp. 1-184 while a compilation of over twenty individual medical texts can be found on pp. 186-368.[64] The medical half of the manuscript has been dated to the second half of the ninth century and Bischoff has suggested that it was written in northern Italy.[65] The texts include a large range of writings within the field of medicine, such as excerpts from the Hippocratic and Galenic corpora, letters of Vindicianus, the so-called *Herbariencorpus*, and prognostic and calendrical texts.[66] Several MMCs can also be found within the manuscript, covering pp. 228-260, 337-54, and 354-68.[67] I transcribed individual marginal remedies noted by Beccaria (pp. 195, 197, and 215), small groups of recipes either unrecorded by Beccaria or labelled 'miscellaneous' (pp. 186, 276-80, 282-6, 304, and 330-6), medical glossaries (pp. 280-1 and 324[b]-329[a]), since these sometimes contain recipes, and the three MMCs.[68] I recorded 850 recipes from these sections of text.

[63] It should be noted that the manuscripts held in St Gall are paginated not foliated.
[64] Csg. 44; Beccaria, I Codici di medicina del periodo presalernitano, pp. 364-8; Bischoff, Katalog der festländischen Handschriften, III, p. 301.
[65] Bischoff, *Katalog der festländischen Handschriften*, III, p. 301; B. Bischoff, 'Italienische Handschriften des neunten bis elften Jahrhunderts in frühmittelalterlichen Bibliotheken ausserhalb Italiens', in C. Questa and R. Raffaelli (eds), *Il libro e il testo: atti del Convegno Internazionale, Urbino, 20-23 Settembre 1982* (Urbino, 1984), 169-94, see pp. 177-8.
[66] Beccaria, *I Codici di medicina del periodo presalernitano*, pp. 364-8. Meg Leja considered this manuscript in relation to her analysis of the *Lorscher Arzneibuch*, see Leja, 'The Sacred Art', pp. 17-18.
[67] For a published transcription of the first MMC, see Sigerist, *Studien und Texte*, pp. 78-99; for the second and third MMCs, see Jörimann, *Frühmittelalterliche Rezeptarien*, pp. 37-61.
[68] I transcribed the MMCs before discovering the existing transcriptions of Sigerist and Jörimann; despite these published transcriptions, I kept my versions in this study because relatively little work has been done on the texts themselves, though all three are included in Opsomer's *Index de la pharmacopée du Ier au Xe siècle*. Indeed, having these transcriptions has provided a means to check my own work against an exemplar and confirm that my transcriptions are in line with the standards set by earlier scholarship.

b) *Csg. 217*

Csg. 217 is thought to have been written in northern Italy and has been dated to the early ninth century by Bischoff.[69] This is a particularly complex manuscript, containing at least two distinct works that were later bound together. Poor binding has resulted in the reordering of quires as well as the loss of certain sections, some of which are also still held in St Gall and will be addressed below in the discussion of csg. 1396.[70] While the Stiftsbibliothek's earliest surviving copy of Gregory's *Regula pastoralis* comprises much of the manuscript (pp. 1-249), a varied collection of medical texts make up the final quarter of the codex (pp. 252-341). Small groups of recipes are interspersed between the *St Galler Botanicus* and *St Galler Bestarius*, neither of which follow their intended order. Monica Niederer's *Der St. Galler* Botanicus has addressed the *Botanicus*, a descendant of the classical and late antique herbal tradition.[71] Within this re-bound environment, I transcribed the recipes found on pp. 253-74 and 332-8, putting the pages in the following order: 255, 256, 253, 254, 259, 260, 257, 258, 261-74, 335-8, and 332-4. From this assemblage, I recorded 307 recipes.

c) *Csg. 751*

A massive codex primarily focused on medical writings, csg. 751 consists of several dozen different texts within its 500 pages.[72] This manuscript appears to have been written in a northern Italian scriptorium, though it probably arrived in St Gall soon after its compilation.[73] Dated to the second half of the ninth century, the compendium contains medical glossaries, the *Liber esculapii*, prognostic and

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[69] Csg. 217; Bischoff, *Katalog der festländischen Handschriften*, III, p. 315. Both Clare Pilsworth and Meg Leja have considered this manuscript in their analyses of medical manuscripts, see Pilsworth, *Healthcare in Early Medieval Northern Italy*, pp. 78-81 and Leja, 'The Sacred Art', pp. 16-17.
[70] P. Köpp, Vademecum eines frühmittelalterlichen Arztes, p. 15.
[71] M. Niederer, Der St. Galler Botanicus: Ein Frühmittelalterliches Herbar: Kritische Edition, Übersetzung und Kommentar (Bern, 2005).
[72] Csg. 751; Beccaria, I Codici di medicina del periodo presalernitano, pp. 372-81.
[73] Bischoff, Katalog der festländischen Handschriften, III, p. 332.

calendrical texts, excerpts from Pliny's *Natural History*, passages from the *Herbariencorpus*, Galenic and Hippocratic texts, selections from Vindicianus' writings, instructions for bloodletting, and works on diet. Between many of these known texts and excerpts, Beccaria described several sections of writing as 'ricette varie', 'altre ricette ed altri estratti', or 'miscellanea di ricette e di estratti' (pp. 37-9, 172-5, 304-8, 318-24, 362-9, 377-414, 414-24, and 430) and failed to comment on a significant number of pages in the final one hundred pages of the manuscript (pp. 431-45, 448-52, 455-63, 467-75, 478-91, and 494).[74] I therefore transcribed these sections as well as a table of contents on pp. 341-7 that corresponded to pp. 355-414 (including the 'miscellaneous' sections on pp. 362-9 and 377-414) and an index on pp. 424-28 (covering the large number of pages unrecorded by Beccaria on pp. 430-496), as well as the final antidote collection (pp. 498-500). The total number of recipes involved in these sections of text, representing several short collections as well as two extensive MMCs (the first on pp. 341-7 and pp. 355-414 and the second on pp. 424-96), came to 1202 recipes.

d) *Csg. 752*

Csg. 752, unlike many of the St Gall manuscripts included in this study, is thought to have been composed at St Gall itself.[75] Paralleling csg. 44 and 217, the codex represents a composite manuscript made up of two distinct units. In this case, both textual units focus on medicine and have been dated to *c*. 900.[76] The first half of the manuscript, pp. 1-159, contains the *Medicina Plinii*. Several texts have been inserted within the *Medicina Plinii*, including a diverse group of medical writings added between the end of book III and the beginning of book IV (covering pp. 80-83), such as a dietetic calendar, a group of remedies for lightening hair, and the *Spera Apulei Platonici*, a medico-mathematical prognostic device used to predict the

[74] Beccaria, I Codici di medicina del periodo presalernitano, pp. 372-81.
[75] Csg. 752; Beccaria, I Codici di medicina del periodo presalernitano, pp. 381-3; Bischoff, Katalog der festländischen Handschriften, III, p. 332.
[76] Beccaria, I Codici di medicina del periodo presalernitano, pp. 381-3; Bischoff, Katalog der festländischen Handschriften, III, p. 332.

outcome of an illness.[77] The second half of the manuscript, pp. 161-326, contains an excerpt from Isidore of Seville's *Etymologies* and one of the few surviving copies of the *Oxea et chronia passiones Yppocratis, Gallieni et Urani*. I transcribed the material inserted between sections of the *Medicina Plinii* on pp. 5, 81-82, and 158-9, totalling sixteen recipes.

e) *Csg. 759*

Bischoff suggests that Csg. 759, an early ninth-century manuscript, was composed in Brittany; the text is written in an insular script that shows continental influences.[78] This 94-page codex contains a variety of medical texts, such as extracts of Oribasius and Galen, dietetic calendars, and information on weights and measurements.[79] The second half of the manuscript, pp. 53-94, contains an MMC. While the index lists 446 entries, a number of pages of the collection have been lost; only entries 1-137 and 271-353 survive, or 220 out of a possible 446 entries from the MMC (49.3%). I transcribed the surviving portions of the MMC as well as two other clusters of recipes on pp. 1-8 and 45-6, producing a total of 451 recipes.

f) *Csg. 761*

Csg. 761, another manuscript written in an insular script, was composed in the early ninth century.[80] Bischoff located the manuscript's origins to Fulda, a scriptorium known to have had scribes writing in a 'continental insular' script.[81] The codex

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[77] R. M. Liuzza, 'The Sphere of Life and Death: Time, Medicine, and the Visual Imagination', in K. O'Brien O'Keeffe and A. Orchard (eds), *Latin Learning and English Lore: Studies in Anglo-Saxon Literature: Studies in Anglo-Saxon Literature for Michael Lapidge*, 2 vols (Toronto, 2005), II, 28-52, p. 29. For a transcription of the *Spera* (both text and image), see H. E. Sigerist, '"The Sphere of Life and Death" in Early Medieval Manuscripts', *Bulletin of the History of Medicine* 11 (1942), 292-303, pp. 294-6.

[78] Csg. 759; Bischoff, Katalog der festländischen Handschriften, III, p. 332.

[79] Beccaria, I Codici di medicina del periodo presalernitano, pp. 384-6.

[80] Csg. 761; Bischoff, Katalog der festländischen Handschriften, III, p. 333; H. Spilling, 'Angelsächsische Schrift in Fulda', in A. Brall (ed.), Von der Klosterbibliothek zur Landesbibliothek. Beiträge zum zweihundertjährigen Bestehen der Hessischen Landesbibliothek Fulda (Stuttgart, 1978), 47-98.

[81] Ibid.

contains extensive selections of Oribasius' *Synopsis* and *Euporista* as well as excerpts from the Hippocratic and Galenic corpora.[82] An unnumbered and unindexed collection of recipes and remedies is on pp. 51-66, and totalled forty-six entries.

g) *Csg. 878*

Csg. 878, a manuscript thought to be Walahfrid Strabo's *vademecum*, contains a wide variety of writings, ranging from works on computus to Priscian's *Institutiones grammaticae*; texts relating to health and medicine are interspersed within the collection.[83] Hippocrates' *Epistula ad Antiochum regem*, Anthimus' *De observatione ciborum*, a treatise on phlebotomy, and several pages of 'miscellanea di ricette e di estratti' according to Beccaria are found in clusters over pp. 327-93. I transcribed the so-called miscellaneous sections (pp. 331-4, 372-7, and 392-3), resulting in sixteen recipes.

Although the manuscript has been linked to Walahfrid, a number of different hands can be seen within its pages. The Old High German glosses on p. 333, for example, have been dated to the eleventh century and therefore certainly cannot be attributed to Walahfrid.[84] However, Bischoff has suggested that the hand responsible for the medical sections on pp. 331-4 and 372-7 also appears to be Walahfrid's, though

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[82] Beccaria, I Codici di medicina del periodo presalernitano, pp. 386-7.
[83] Csg. 878; for more on csg. 878 and its connection to Walahfrid Strabo, see B. Bischoff, 'Eine Sammelhandschrift Walahfrid Strabos (Cod. Sangall. 878)', *Mittelalterliche Studien, Ausgewählte Aufsätze zur Schriftkunde und Literaturgeschichte*, 3 vols (Stuttgart, 1966-81), II, pp. 34-51 as well as recent and forthcoming works by R. Corradini, including 'Pieces of a Puzzle: Time and History in Walahfrid's *Vademecum*', *Early Medieval Europe* 22 (2014), 476-91; *Historiographie als Zeitdiagnose. Studien zum Kompendium des Walahfrid Strabo (St. Gallen, Stiftsbibliothek 878)* (forthcoming); and *ZeitNetzWerk. Karolingische Gelehrsamkeit und Zeitforschung im Vademecum des Walahfrid Strabo. Studien zur Überlieferungsgeschichte des Kompendiums* (forthcoming); for the medical sections, see Beccaria, *I Codici di medicina del periodo presalernitano*, pp. 391-3.
[84] E. von Steinmeyer and E. Sievers, *Die althochdeutschen Glossen*, 5 vols (Berlin, 1879), IV, p. 455.

the text on pp. 392-3, a collection of antidotes, belongs to a different hand, named scribe 'P' by Bischoff.[85]

h) *Csg. 1396*

Csg. 1396, unlike the manuscripts reviewed above, represents a collection of fragments that the Stiftsbibliothek St Gallen keeps together as a single unit.[86] Within this diverse assemblage, there is a section of fragmentary medical writings, several of which date to the Carolingian period. The poor binding of csg. 217, as noted above, resulted in the loss of sections of text from the original manuscript; some of these pages, however, have been preserved and make up part of the collection of csg. 1396, pp. 9-16 and 19-22.[87] These pages belong to the same group of recipes I transcribed from csg. 217, meaning they too originated in a northern Italian centre in the early ninth century. My transcription of this collection produced an additional 118 recipes.

2. Biblioteca Apostolica Vaticana

a) *BAV lat. 5951*

Dated to the first quarter of the ninth century, Bischoff has suggested that BAV lat. 5951 was composed in Italy or possibly southern Burgundy.[88] Certain elements in the script and particular notes might reflect a connection to Nonantola.[89] The manuscript mostly consists of Celsus' *De Medicina*, although book I of Muscio's *Gynaecia* was inserted in the twelfth century. In addition to these two texts, recipes

[85] More specifically, Bischoff considers the writing on pp. 331-4 to represent 'W III', the penultimate phase of Walahfrid's script, whereas he has labelled the text on pp. 372-7 as 'W IV', thereby dating this section of the manuscript to the final years of Walahfrid's life. Bischoff, 'Eine Sammelhandschrift Walahfrid Strabos (Cod. Sangall. 878)', pp. 34-51 and personal communications with Richard Corradini.

[86] Csg. 1396; Bischoff, Katalog der festländischen Handschriften, III, pp. 315, 337-8; Beccaria, I Codici di medicina del periodo presalernitano, pp. 393-4.

[87] On the original order of the pages in csg. 217, see Köpp, *Vademecum eines frühmittelalterlichen Arztes*, p. 15.

[88] Biblioteca Apostolica Vaticana (BAV) lat. 5951; Bischoff, *Katalog der festländischen Handschriften*, III, p. 455.

[89] Beccaria, I Codici di medicina del periodo presalernitano, pp. 312-13.

have been added as marginal notes on ff. 1^{r}, 1^{v}, 2^{r}, 66^{v}, and 68^{v}. My transcription of the legible notes on these folia resulted in three recipes.

b) *BAV pal. lat. 1088*

BAV pal. lat. 1088, written in the area of Lyon in the middle or third quarter of the ninth century, is a manuscript containing entirely medical information.[90] Excerpts of Galen, Quintus Serenus, and Vindicianus as well as several groups of recipes, including both an MMC and clusters of unnumbered material, are contained within its 121 folia.[91] Glosses in Old High German can be seen in the MMC.[92] I transcribed a complete MMC on ff. 31^{r}-50^{r} (index on 31^{r}-33^{rc}), a small recipe collection on ff. 50^{r}-66^{r} (another example of a 'miscellanea di ricette e di estratti' according to Beccaria), and individual recipes inserted into ff. 94^{r}-95^{r} and 107^{v}. The total number of recipes from these collections and insertions comes to 809.

c) *BAV reg. lat. 598*

BAV reg. lat. 598 represents a collection of fragments written at different times and covering a variety of topics.[93] Two sections of the manuscript concern medicine and have been dated to the Carolingian period: ff. 26^{r}-33^{r} and 124^{r}-125^{r}. The first section contains a selection of excerpts from known texts, such as Quintus Serenus' *Liber medicinalis* and Hippocrates' *Epistula ad Antiochum regem*, and thus was not included in my transcription. I concentrated on ff. 124^{r}-125^{r}, a small collection of recipes written in *c*. 900, from which I recorded twelve individual recipes. These folia appear to be relatively understudied; while Bischoff addressed other sections of the manuscript in his *Katalog der festländischen Handschriften*, he does not comment on this passage.[94]

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[90] BAV pal. lat. 1088; Bischoff, Katalog der festländischen Handschriften, III, p. 418; Beccaria, I Codici di medicina del periodo presalernitano, pp. 313-16.
[91] Beccaria, I Codici di medicina del periodo presalernitano, pp. 313-16.
[92] von Steinmeyer and Sievers, *Die althochdeutschen Glossen*, IV, pp. 363-5 and 367-8.
[93] BAV reg. lat. 598; Beccaria, I Codici di medicina del periodo presalernitano, pp. 316-17.
[94] Bischoff, Katalog der festländischen Handschriften, III, pp. 433-4.

d) *BAV reg. lat. 1143*

BAV reg. lat. 1143 is an early ninth-century manuscript made up of three codicological units: a) ff. 1-85 and 201-202, b) ff. 86-189, and c) ff. 190-200.[95] At least four quires are missing (V-VI and XIII-XIV) and the manuscript has been damaged by humidity. Bischoff has suggested that the codex was composed in the area around Mainz.[96] The surviving texts are entirely related to health and medicine and include a selection of Theodorus Priscianus's *Euporiston*, the end of book III of Alexander of Tralles' *Therapeutica*, Vindicianus' *Epistula ad Pentadium*, Hippocrates' *Epistula ad Antiochum regem*, as well as a large number of recipes and extracts labelled 'miscellaneous' by Beccaria.[97] I transcribed these so-called miscellaneous passages on ff. 80^{v}-86^{r}, 105^{v}-109^{v}, 118^{r}-125^{r}, 129^{v}-134^{v}, 141^{r}-187^{v}, 188^{r}-189^{r}, 190^{r}-193^{r}, and 196^{r}-200^{r}, producing a total of 313 recipes.

3. BIBLIOTHÈQUE NATIONALE DE FRANCE

a) *Paris BnF lat. 2849A*

Dated to the third quarter of the ninth century, Paris BnF lat. 2849A contains a wide range of texts, from theological works of Alcuin (ff. 24^{r}-76^{v}) to a small cluster of remedies (ff. 18^{v}-23^{v}).[98] Bischoff was not certain where to place its origins, but suggested that it was most likely to have been composed at a scriptorium in France or Italy.[99] I transcribed the collection on ff. 18^{v}-23^{v}, totalling fifty-eight recipes.

[95] BAV reg. lat. 1143; Bischoff, *Katalog der festländischen Handschriften*, III, p. 438.
[96] Bischoff, Katalog der festländischen Handschriften, III, p. 438.
[97] Beccaria, I Codici di medicina del periodo presalernitano, pp. 319-22.
[98] Paris BnF lat. 2849A; Beccaria, I Codici di medicina del periodo presalernitano, p. 140; E. Wickersheimer, Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France (Paris, 1966), pp. 59-61.
[99] Bischoff, Katalog der festländischen Handschriften, III, p. 86.

b) *Paris BnF lat. 6882A*

Paris BnF lat. 6882A is a composite manuscript made up of medical texts written in the ninth, twelfth, and thirteenth centuries.[100] The ninth-century material, dated more specifically to the first half of the ninth century by Bischoff, is situated at the beginning of the manuscript, ff. 1-26. Bischoff suggests that it may have been composed in southwest France, while Wickersheimer is more specific, connecting this work to the scriptorium of St-Hilaire in Poitiers.[101] Within this section of the manuscript, excerpts from the Pseudo-Galenic *De succedaneis liber* and Isidore's *Etymologies* can be found alongside information on weights and measures, instructions for phlebotomy, *hermeneumata*, and 'miscellanea di ricette e di estratti'.[102] I transcribed a list of contents on ff. 1^{v}-8^{v} (including recipes found in its margins), the *hermeneumata* on ff. 9^{r}-11^{r} and 24^{v}-26^{v}, and 'miscellaneous' recipes (many with a focus on gynaecological issues) on ff. 11^{r}-11^{v}, 18^{r}-18^{v}, 19^{r}-19^{v}, and 21^{r}-24^{r}. This transcription resulted in a total of sixty-one recipes.

c) *Paris BnF lat. 7021*

According to Bischoff, Paris BnF lat. 7021 can be dated to the first or possibly second quarter of the ninth century and may have been written at a centre in the vicinity of Paris.[103] Hippocrates' *Aphorisms* represents the primary text of this manuscript, covering ff. 1^{r}-118^{r} out of 119 folia.[104] I transcribed the only other text contained within the codex, a single remedy located on ff. 118^{v}-119^{r}.[105]

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[100] Paris BnF lat. 6882A; Beccaria, I Codici di medicina del periodo presalernitano, pp. 148-9; Wickersheimer, Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France, pp. 72-4.
[101] Bischoff, Katalog der festländischen Handschriften, III, p. 119; Wickersheimer, Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France, p. 72.
[102] Beccaria, I Codici di medicina del periodo presalernitano, pp. 148-9.
[103] Paris BnF lat. 7021; Bischoff, Katalog der festländischen Handschriften, III, p. 119; Wickersheimer, Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France, pp. 74-7.
[104] Beccaria, I Codici di medicina del periodo presalernitano, p. 150.
[105] Cf. Wickersheimer's transcription of this recipe in Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France, pp. 74-7).

d) *Paris BnF lat. 9332*

Paris BnF lat. 9332, an early ninth-century manuscript from western France (most probably Fleury), contains excerpts from three well-known classical and late antique medical texts: Oribasius' *Synopsis* (ff. 1^{va}-138^{va}), Alexander of Tralles' *Therapeutica* (ff. 138^{vb}-242^{vb}), and Dioscorides's *De materia medica* (243^{ra}-321^{va}).[106] The earliest surviving copy of the *Epistula vulturis*, a short treatise on medico-magical uses of vulture body parts, was inserted into the text of Dioscorides on f. 251^{va}-251^{b}.[107] In addition to these writings, unattributed remedies are located on ff. 69^{rb}, 233^{vb}, and 321^{va}. My transcriptions of these sections produced nine recipes.

e) *Paris BnF lat. 11218*

Bischoff noted a number of early Caroline hands in Paris BnF lat. 11218, dating the 126-folia manuscript to the late eighth or early ninth centuries and suggesting Burgundy as a possible location for its composition.[108] Its contents are entirely medical, and include a diverse range of texts, such as excerpts from the Hippocratic and Galenic corpora, several texts from Vindicianus, a selection of Isidore's *Etymologies*, *Hermeneumata*, instructions on phlebotomy, a variety of prognostic and calendrical works, as well as unattributed recipes.[109] I transcribed ff. 10^{v}-12^{r}, a collection of antidotes, resulting in twelve individual recipes.

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[106] Paris BnF lat. 9332; Bischoff, Katalog der festländischen Handschriften, III, p. 148; Beccaria, I Codici di medicina del periodo presalernitano, pp. 157-9; Wickersheimer, Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France, pp. 89-93.

[107] L. C. MacKinney, 'An Unpublished Treatise on Medicine and Magic from the Age of Charlemagne', *Speculum* 18 (1943), 494-6, p. 494.

[108] Paris BnF lat. 11218; Bischoff, *Katalog der festländischen Handschriften*, III, p. 170.

[109] Beccaria, I Codici di medicina del periodo presalernitano, pp. 161-6; Wickersheimer, Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France, pp. 100-112.

f) *Paris BnF lat. 13955*

Paris Bnf lat. 13955, the final manuscript in this sample, was, according to Bischoff, composed in Corbie.[110] While this 169-folia manuscript, dated to the middle or third quarter of the ninth century, concentrates on writings related to the liberal arts, and especially the quadrivium, a handful of texts address other topics, such as agriculture and medicine. Following excerpts from Columella's *De re rustica*, a medical section can be found on ff. 137^{v}-147^{v}. This ten-folia collection of writings contains a selection from the *Herbariencorpus* (ff. 137^{v}-146^{r}) and unattributed recipes (ff. 146^{r}-147^{v}). I transcribed the latter section, recording a total of fifty-one recipes.

4. SUMMARY OF SAMPLE AND A CONSIDERATION OF ITS REPRESENTATIVITY

As shown in Table 2.1, the total number of recipes from the eighteen-manuscript sample comes to 4335. Given the uneven distribution of recipes between manuscripts—Paris BnF lat. 7021 contains just one recipe whereas csg. 751 includes over 1000—it must be noted that certain codices are referred to more frequently in the following chapters than others.

[110] Paris BnF lat. 13955; Bischoff, Katalog der festländischen Handschriften, III, p. 214; Beccaria, I Codici di medicina del periodo presalernitano, p. 176; Wickersheimer, Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France, pp. 128-34.

Table 2.1 Number of recipes in each manuscript		
Library	Manuscript	# of recipes
Stiftsbibliothek St Gallen	csg. 44	850
	csg. 217	307
	csg. 751	1202
	csg. 752	16
	csg. 759	451
	csg. 761	46
	csg. 878	16
	csg. 1396	118
Biblioteca Apostolica Vaticana	lat. 5951	3
	pal. lat. 1088	809
	reg. lat. 598	12
	reg. lat. 1143	313
Bibliothèque national de France	lat. 2849A	58
	lat. 6882A	61
	lat. 7021	1
	lat. 9332	9
	lat. 11218	12
	lat. 13955	51
Total		4335

The manuscripts studied in this dissertation, involving approximately a quarter of the surviving codices containing medical texts written in eighth- and ninth-century western Europe, offer a broadly representative sample. First, the manuscripts span the full chronological range of this dissertation, with several manuscripts dated to the late eighth or early ninth centuries, the majority of manuscripts dated to the ninth century, and the two latest manuscripts dated to *c*. 900. These codices were written at sites across early medieval western Europe, including scriptoria at the centre of Carolingian intellectual developments, such as St Gall and Reichenau, as well as sites at the periphery of the Frankish Empire, such as northern Italy. Furthermore, scriptoria in north-western Francia and northern Italy appear to have produced the largest numbers of manuscripts containing medical texts during this period and the sample involves several manuscripts located to these regions.[111] The eighteen-manuscript sample also contains a range of manuscript types, including composite codices consisting of distinct units, mixed manuscripts containing texts on medicine and other topics, as well as manuscripts dedicated exclusively to medical writings. Based on the surviving evidence, this sample thus offers a representative selection of the manuscripts that include medical writings, and especially recipes, that circulated in the Carolingian world and is particularly suited to the chronological and geographical framework of this dissertation.

5. CONTEXTS OF MANUSCRIPT PRODUCTION

According to Florence Eliza Glaze, all of the extant early medieval manuscripts containing medical texts are 'likely monastic products'.[112] This context of production has helped give rise to the problematic concept of *Mönchsmedizin*, 'monastic medicine', i.e., the idea that 'the medieval medical literature…comes from and belongs in monasteries'.[113] By restricting early medieval medical knowledge and practice to a monastic environment, our understanding of the texts and contexts in which they could have been used has been likewise restricted. While there is strong evidence for the production of these manuscripts in monastic scriptoria and for their continued existence in these communities, there is also evidence for their presence in lay households: the Carolingian counts Everard of Friuli and Eckhard of Macon are both recorded as owning one medical manuscript.[114] Therefore, although no surviving eighth- and ninth-century manuscripts containing medical writings appear to have

[111] Leja, The Sacred Art', p. 4.
[112] Glaze, 'The perforated wall', p. 1.
[113] B. Schnell, 'Prolegomena to a History of Medieval German Medical Literature: The Twelfth Century', in M. R. Schleissner (ed.), *Manuscript Sources of Medieval Medicine: A Book of Essays* (New York, 1995), 3-15, p. 12. For early studies commenting on the monastic context of early medieval medicine see Sigerst, *Studien und Texte* (especially p. 186) and Jörimann, *Frühmittelalterliche Rezeptarien* (especially p. 1).
[114] On the evidence for the circulation of medical manuscripts, see Glaze, 'The perforated wall', pp. 69-79; on lay medical book ownership, see Glaze, 'The perforated wall', pp. 13-14, n. 6.

been produced outside of monastic scriptoria, it is evident that the manuscripts themselves could move beyond the cloister.

However, given the large number of manuscripts that remained in monastic contexts, such as the libraries of Lorsch, St Gall, Reichenau, and Corbie, it is important to reflect on this environment. Under the influence of *Mönchsmedizin*, the inclusion of certain types of medical writings, such as gynaecological texts, in these codices was used to argue that ancient texts were blindly copied and had little practical value. Countering this interpretation, Peregrine Horden has shown that texts on 'problematic' topics such as gynaecology could have been used in multiple ways and in multiple settings.[115] In a monastic environment without childbearing community members, for example, a gynaecological treatise could have been read as a work on natural history.[116] Alternatively, given the 'comings and goings of elite patronesses; of the mothers, sisters, daughters and former wives of monks; of labourers on the monastery's estates', it is possible that the texts were studied in relation to therapy.[117] Ultimately, understanding medical texts through the lens of *Mönchsmedizin* is highly problematic, and, as Horden writes, 'what has often been called monks' medicine was not especially monastic. It simply comes to us from monastic manuscripts.'[118] While I shall not elaborate further on the question of how medical texts were used and, more specifically, whether there is evidence to suggest that they were consulted in relation to medical practice (this question will be addressed in Chapter 10), it is essential to recognise at the outset of this study that a) the use of medical texts could have taken multiple forms, and b) the environments in which the texts were used could have extended beyond the cloister.

[115] Horden, 'What's Wrong with Early Medieval Medicine?', pp. 12-13.
[116] Ibid, p. 12.
[117] Ibid, p. 13.
[118] Ibid.

Approach to the textual analysis

After using Beccaria's catalogue to identify manuscripts containing unattributed recipes, I transcribed this material.[119] I used digital facsimiles where possible before examining the manuscripts in person. Once transcribed, I could begin to edit the texts, producing searchable, digital copies of each transcription. These edited texts have provided the basis for a detailed textual analysis, allowing me to select any term or phrase and search for its presence in the textual sample. While I have primarily concentrated on tracing the use of particular ingredients, my analysis also included studies of the terms used to describe symptoms and conditions as well as the units listed in recipes.

The results of these searches could then be compared to classical and late antique medical texts and other writings, such as glossaries, encyclopaedias, or works on plants. A number of particularly illuminating data clusters emerged from these analyses, three of which have now become individual chapters. Chapter 3, for example, began as an investigation into the various alcohols used in remedies since I was intrigued to come across beer and mead in MMCs, but rarely—if ever—in classical texts. I was able to search for terms such as *cervisia* (beer) and *medus* (mead), and their orthographic variants, and then compare my findings to the known classical and late antique medical traditions using resources such as Carmélia Opsomer's *Index de la pharmacopée du I^er^ au X^e^ siècle*.[120] This index of the ingredients found in the recipes of over fifty medical texts written between the first and tenth centuries presents a useful overview of the frequencies with which particular products are named. Of the recipe collections involved in the present study, only the three MMCs from csg. 44 are included in Opsomer's index; the recipes and recipe collections from the other manuscripts assessed here, lacking published transcriptions, were not part of the index. Finally, I consulted the texts listed by Opsomer that included the ingredients in

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[119] Secondarily, I also consulted Ernest Wickersheimer's catalogue on medieval medical manuscripts in French collections, *Les manuscrits latins de médecine du haut moyen age dans les bibliothèques de France*, for the six manuscripts today located in the Bibliothèque nationale de France.
[120] Opsomer, Index de la pharmacopée du Ier au Xe siècle.

question and contextualised these results with additional sources. Chapter 4 involved a similar process, though the ingredients under consideration, exotic products, are of a very different nature. Chapter 5 then looks at the bigger picture, exploring additional features that may suggest the potential practicality of recipes, such as the use of a vernacular unit of measurement and the process of compilation involved in producing MMCs.

In all three of these chapters, the results ultimately concern the topic of practicality. An analysis of ingredients explores whether the recipes were practical: could these ingredients have been locally sourced? Is it possible that new ingredients appeared in the written record due to the changing availability of certain products? On the other hand, investigating the sources of and influences on the recipe collections offers new insights into how eighth- and ninth-century scribes composed these collections, revealing what information they thought was significant enough to copy, highlighting which texts they may have been consulting, and reflecting the active selection process that must have occurred to produce these medical compendia.

Chapter 3

Medicine and the Mead Hall? The Incorporation of Local Ingredients

The frequency with which alcohols are mentioned in medical texts is noteworthy. Various alcoholic beverages, including wine, beer, and mead, appear in many dietetic works detailing the foods and drinks best suited to balancing the humours or, conversely, those to be avoided. Remedies, too, make frequent use of these beverages and others, such as mixtures of wine with honey or water. Of the sixteen recipes in csg. 752, the second, sixth, and sixteenth recipes each include wine as an ingredient, while the fifteenth recipe notes both beer and mead. My translation of these remedies is as follows (see Figures 3.1-3 for the manuscript context):

2. For melancholy: dodder, 10 drachmas; dried mint, 10 pounds; pepper, 1 [pound?]; grind these together finely and give the entire potion with old wine in half a cup. Do this frequently, it is most useful.[1]

6. For paralysis: juice of the herb sage, 6 drachmas; juice of savin, 4 drachmas; honey, 2 drachmas; wine, 1 [no unit given]; drink on an empty stomach; it heals wonderfully.[2]

15. To help haemorrhoids: take plantain and the sour herb known by others by the name *gundereba* and mule tallow, this is *unslit*, and beat these three ingredients in a mortar and then mix in a small pan. When hungry, eat this with bread. Do not drink beer and mead but only water before you are healed.[3]

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[1] Csg. 752, p. 5: De melancolicis…Epitimo drachma . x . menta sicca liber . x . ~ iii piper est i hęc conteres subtilissime et dabis exinde integra potione . ~ . x . et media potione ~ v . cum uino uetere medio calice . faciat hoc frequenter . utilissimum est. For more information on this manuscript and the others analysed in the present study, see Chapter 2.

[2] Csg. 752, p. 5: Ad paralisin sucum erbę salua\i/e . drachma vi . sucum sauine . drachma iiii mel dispumatum drachma . ii . uino est i ieiun<us> bibat <mirifice> sanat.

[3] Csg. 752, p. 158: **De fico emendando** Accipe plantaginem . et herbam acerem . quae alio nomine gundereba nominatur . et seuum de multone hoc est unslit . et ista tria tundantur . in mortaliolo . et fricantur in patella . et sic ieiunus comedat cum pane . ceruisam et medum . nec aquam bibat antequam sanetur.

16. For people suffering from tertian or quotidian fevers: collect a handful of vervain, which by others is called *isaurina*, and nine grains of pepper, and mix them together with wine. Drink one cup [of this mixture] before the onset of the fever.[4]

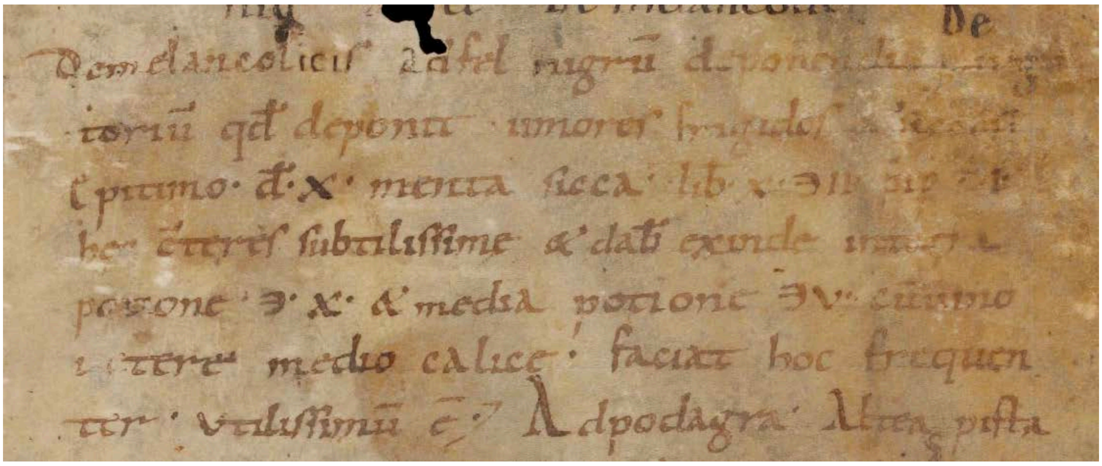

Figure 3.1: De melancolicis *(csg. 752, p. 5)*

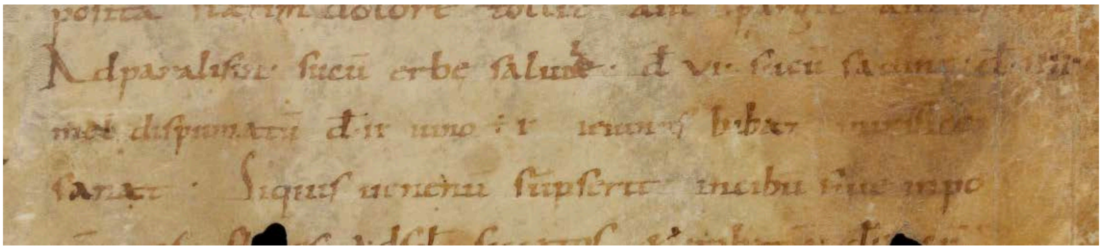

Figure 3.2: Ad paralisin *(csg. 752, p. 5)*

[4] Csg. 752, p. 158: Si tertiana . aut cottidiana febris hominem tangit . colligat de ueruena manipulum . i . quae alio modo isarnina uocatur . et viiii . grana de pipero . et cum uino mixtam componat . et ante accessionem inde bibat staupum unum.

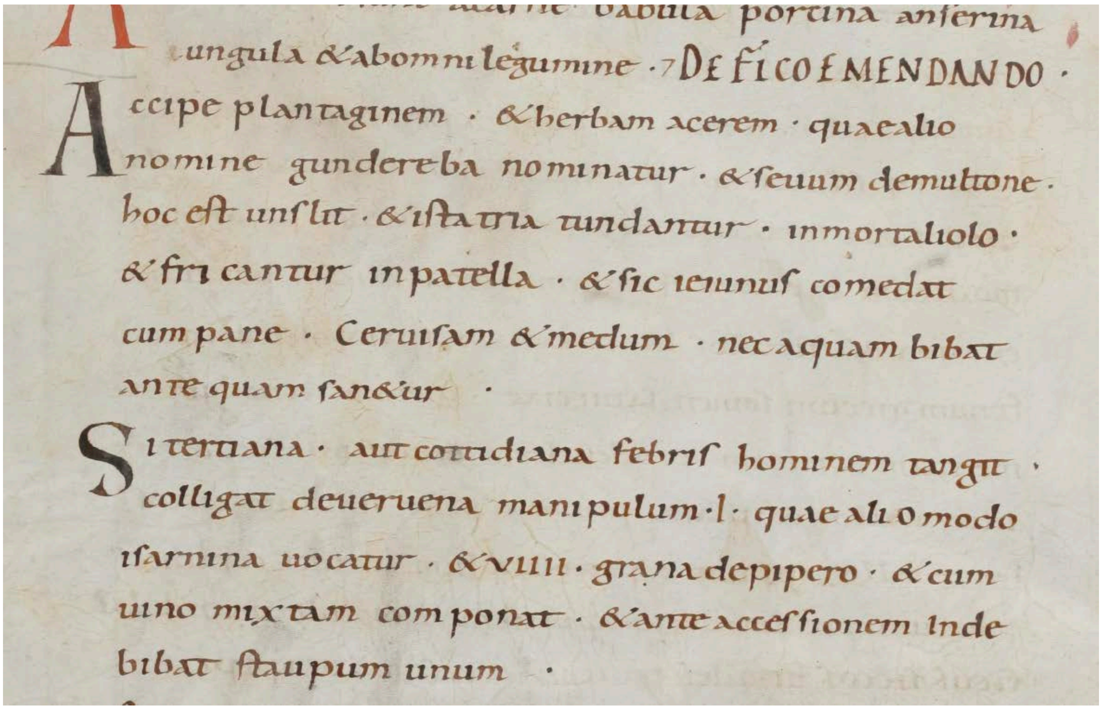
... uabula porcina anserina
ungula & ab omni legumine · DE FICO EMENDANDO ·
Accipe plantaginem · & herbam acerem · quae alio
nomine gundereba nominatur · & seuum de multone ·
hoc est unslit · & ista tria tundantur · in mortaliolo ·
& fricantur in patella · & sic ieiunus comedat
cum pane · Ceruisam & medum · nec aquam bibat
ante quam sanetur ·
Si tertiana · aut cottidiana febris hominem tangit ·
colligat de ueruena manipulum · I · quae alio modo
isarnina uocatur · & VIIII · grana de pipero · & cum
uino mixtam componat · & ante accessionem inde
bibat staupum unum ·

***Figure 3.3**:* De fico emendando *and* Si tertiana… *(csg. 752, p. 158)*

After the final recipe on p. 158, there is a short text that describes certain foods and drinks from which to abstain if suffering from paralysis, *Quibus cibis abstinere debeant quem paralysin tangit* (see Figure 3.4). Bread, various meats (beef, pork, and goat), fish, most legumes, and unrefined olive oil are to be avoided, as are all drinks that have the potential to cause inebriation.[5] The author of this passage, however, makes several exceptions, noting three alcoholic beverages that would be acceptable to drink: thin white wine, thin mead, and thin, light beer.

In a manuscript containing just twelve unattributed remedies, one of the smallest collections in the entire manuscript sample, four recipes (25% of the total) record alcoholic beverages. All three alcohols that appear in these recipes are also noted in the dietary guidelines that follow the recipe cluster. The sheer prevalence of

[5] Csg. 752, p. 158: **Quibus cibis abstinere debeant Quem paralysin tangit** A pane hordeatio et omni pane azimo . a carne boum et porcina et caprina . ab omni aue aquatili . ab omni pisce squammam non habente . ab omni legumine pręter lentem . et foenumgrecum . ab omni olere crudo . ab omni fungo . ab omni potione quae inebriat pręter uinum album tenue . et medum tenue et ceruisam tenuam ac leuem… (The list continues but repeats several of the sections above.)

alcohol in medical texts, and especially in remedies, thus demands an in-depth investigation, while traditional stereotypes attached to each of these beverages add further layers of significance to the questions addressed in the present study.

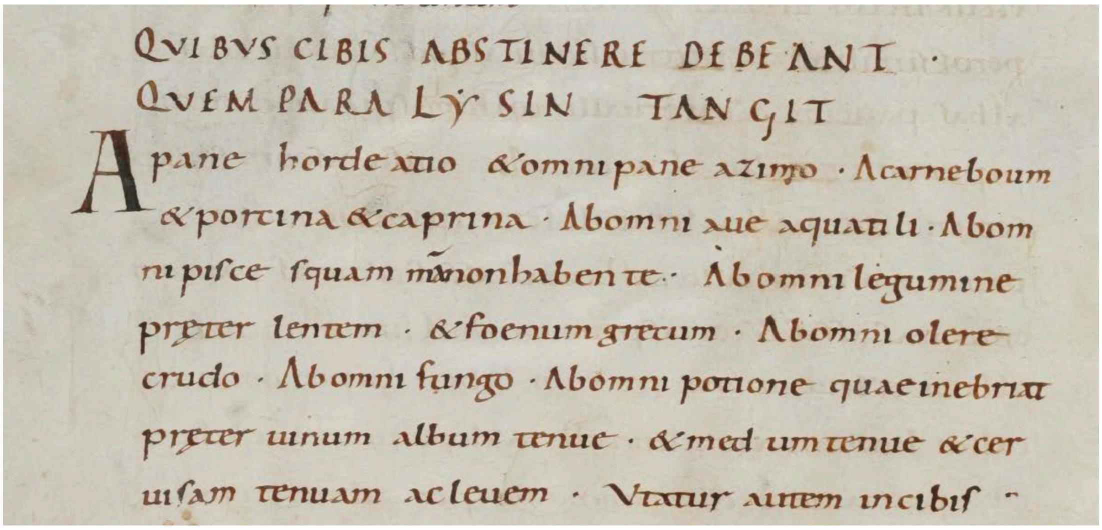
QVIBVS CIBIS ABSTINERE DEBEANT ·
QVEM PARALYSIN TANGIT
A pane hordeatio & omni pane azimo · A carne boum
& porcina & caprina · Ab omni aue aquatili · Ab om
ni pisce squam mnon habente · Ab omni legumine
preter lentem · & foenum grecum · Ab omni olere
crudo · Ab omni fungo · Ab omni potione quae inebriat
preter uinum album tenue · & medum tenue & cer
uisam tenuam ac leuem · Vtatur autem in cibis ·

***Figure 3.4**:* Quibus cibis abstinere debeant… *(csg. 752, p. 158)*

In this chapter, I shall first review the attitudes towards and roles played by various alcohols in classical and late antique medicine before turning to the early medieval evidence. In contrast to classical medical texts, which promote the use of wine but regard beer as unhealthy, my analysis of eighth- and ninth-century recipes uncovered treatments that list beer as an ingredient. Simultaneously, I observed the introduction of a new term for mead, *medus*, in medical contexts. The appearance of these alcohols in recipes, often listed together, indicates that classical and late antique medical knowledge was not passively received, but that early medieval scribes actively engaged with this material. Supported by non-medical sources that document beer and mead production in the Frankish Empire, I argue that the inclusion of beer and *medus* reveals adaptations made to suit local conditions. Such changes reflect one aspect of the practicality of the remedy collections involved in this study and bear witness to an evolving healthscape.

Wine, beer, and mead in the classical Mediterranean context

Beer, ale, and mead tend to be portrayed as having northern European origins; these alcohols are seen in Germanic contexts and as drinks consumed by rowdy barbarians. Wine, in contrast, is more often associated with the classical, Mediterranean world. These stereotypes persist today: beer remains the everyman's drink while wine tends to be more expensive, imported, and perceived as sophisticated.

These are, of course, stereotypes that depend, whether openly acknowledged or not, on the narrative of a 'clash of cultures' that resulted in a sharp break between classical antiquity and the barbaric 'Dark Ages'. Modern scholarship has, thankfully, revised the notion of decline and fall, highlighting instead the vibrant, flourishing intellectual culture of the Carolingian world as well as many continuities between the Roman Empire and its successors.[6] With that being said, the image of manly (barbarian) beer in contrast to sophisticated (classical) wine has persisted. The divide can be seen along geographic lines, as well, with northern and western Europe historically producing and enjoying beer while southern, Mediterranean Europe focused on wine. Is this divide purely due to the environmental and climatic conditions needed for producing each beverage? Or have cultural factors played a role? Or is the separation of beer- and wine-drinking areas a more modern concept that has been inappropriately applied to the past?

The north-south divide of alcohols in a European context has been extensively explored in recent scholarship.[7] The fact that there are (and were) many areas in

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[6] See, for example, Rosamond McKitterick's work on literacy, scholarship, and culture in the Carolingian period, such as McKitterick, 'The Carolingian Renaissance of Culture and Learning', pp. 151-66; R. McKitterick, *History and Memory in the Carolingian World* (Cambridge, 2004); R. McKitterick (ed.), *Carolingian Culture: Emulation and Innovation* (Cambridge, 1994); or McKitterick, *The Carolingians and the Written Word*.

[7] R. C. Engs, 'Do Traditional Western European Drinking Practices Have Origins in Antiquity?', *Addiction Research* 2 (1995), 227-39, pp. 228-31; M. Nelson, 'The Geography of Beer in Europe from 1000 BC to AD 1000', in M. Patterson and N. Hoalst-Pullen (eds), *The Geography of Beer: Regions, Environments, and Societies* (Dordrecht, 2014), 9-21, pp. 9-10; B. Wayens, I. Van den Steen, and M. E. Ronveaux, 'A Short Historical Geography of Beer', in A. Montanari (ed.), *Food and Environment: Geographies of Taste* (Rome, 2002), 93-114, pp. 93-4.

Europe where both cereals and grapes can grow is a major challenge to the strict division of drinking cultures along geographic lines. Max Nelson suggests that north-south theories are both misleading and outdated, noting changing drinking patterns in modern Europe (moving towards a general homogenisation) as well as the highly complex situation in the past.[8] Despite their inaccuracies, the development of these stereotypes is crucial to understanding the changing roles of various alcohols in western medical traditions.

Textual and archaeological evidence speaks to the ancient origins of humankind's relationship with alcoholic substances. At present, the earliest archaeological evidence for fermentation in Europe has been dated to the Bronze Age.[9] The alcoholic beverages produced at this time appear to have been of a mixed nature, potentially combining fermented cereals, fruits, and honey. This blend indicates that a north-south divide in the early stages of alcohol production is certainly incorrect. However, early textual sources relate the development of particular traditions in different regions, with winemaking centred in the south, brewing in the north, and many areas of overlap between the two. The attitudes passed down in these texts, at first largely written by Greek sources, became orthodoxy, reinforcing the biases and prejudices of later authors.

The first negative depictions of beer in Greek sources come from the plays of Aeschylus, written in the early fifth century BC. Nelson shows that beer is repeatedly seen as an unmanly product of Thrace and Egypt, charting the portrayal of beer, *zūthos*, in Greek drama and writing that 'the drinking of beer continued to be made fun of, particularly with regard to its effeminate qualities'.[10] Further examples can be seen in the works of Cratinus (fifth century BC) and Antiphanes (fourth century BC). These

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[8] Nelson, 'The Geography of Beer', p. 10.
[9] A. Sherratt, 'Alcohol and its Alternatives: Symbol and Substance in Pre-Industrial Cultures', in J. Goodman, P. E. Lovejoy, and A. Sherratt (eds), *Consuming Habits: Drugs in History and Anthropology* (London, 1995), 11-46, p. 25.
[10] M. Nelson, The Barbarian's Beverage: A History of Beer in Ancient Europe (London, 2005), pp. 25, 32.

negative stereotypes were not restricted to the stage, but rather maintained and expanded by writers in other fields, including medicine.

Although no references to beer appear in the Hippocratic corpus, Galen (*c*. 129-200/216 AD) comments on *zūthos*, mentioning it in relation to the 'Alexandrian diet', thereby continuing to connect beer-drinking with Egypt and to see it as a foreign peculiarity.[11] From a medical perspective, he writes that the beverage causes flatulence and bad humours.[12] These two qualities were noted by the earlier medical author Dioscorides (*c*. 40-90 AD). Dioscorides' *De materia medica* discusses the medical properties of roughly 1000 different substances, including *c*. 700 plant-based products and *c*. 300 animal- or mineral-based products.[13] He has two entries for beer, differentiating between *zūthos* and *courmi*. The former, made from barley, is 'especially hurtful to the membranes, it is apt to cause flatulence, to engender an unhealthy state of humors, and to cause elephantiasis'.[14] On *courmi*, made from either barley or wheat, he writes: it 'causes headaches, is unwholesome, and does damage to the sinewy parts'.[15] Dioscorides specifically links wheat beers to Spain and Britain.

In stark contrast, *De materia medica* includes roughly one hundred entries for different types of wines and other fruit-based alcohols, honey-based alcohols, and alcohols made up of both honey and fruit, nearly all of which highlight the potential medicinal values of these types of drinks. At this point, it is important to note that the definitions of the various alcohols under consideration have changed over time and the situation is more complicated than a simple tripartite division between wine, beer, and mead. For the purposes of this discussion, I use the term 'wine' to mean any fermented beverage produced from fruit. Grapes are generally, but by no means exclusively, the

[11] Galen, *Commentary on Hippocrates' Aphorisms*, 2.20, ed. C. G. Kühn, *Claudii Galeni Opera Omnia*, 20 vols (Leipzig, 1821-33), see specifically XVIIb.492.14–493.5.
[12] Galen, *De simplicium medicamentorum temperamentis et facultatibus*, 6.6.3, ed. C. G. Kühn, *Claudii Galeni Opera Omnia*, 20 vols (Leipzig, 1821-33), XI.379– 892K and XII.1–377K, see specifically XI.882.5–8.
[13] Dioscorides, *De materia medica*; Nutton, Ancient Medicine, pp. 178-9.
[14] Dioscorides, *De materia medica*, II.87, p. 131.
[15] Ibid, II.88, p. 131.

fruit in question.[16] The term 'beer' represents fermented beverages made from malted cereals, including wheat, barley, and other grains. Finally, 'mead' refers to fermented beverages produced from honey. As will be discussed below, there is some overlap and ambiguity between the categories of wine and mead, due to blends of the two substances and mixtures of wine with honey. Many modern translations are perhaps overzealous in their use of 'mead', deploying it in cases where a term like 'honeyed-wine' would have been more appropriate. However, as Nelson notes, 'the distinction between those substances which were meant to ferment and those simply added to, or macerated in, a fermented beverage for flavour can rarely be determined either from archaeological remains or from the information in our written sources'.[17] I shall revisit the question of terminology, especially with regard to mead, below, but first Dioscorides' comments on wine(s) and mead(s) must be considered.

Of the 162 entries in Book 5 of *De materia medica*, seventy-one of the first seventy-three entries concern grapes, wine, mead, and related products such as honey and vinegar; the two exceptions are entries for water and sea water. The rest of Book 5, excluding entry 114 on wine lees, addresses mineral products. While the entry on wine itself (entry 6), does mention some harmful effects (from flatulence to drunkenness), the passage emphasises the good qualities of the beverage: 'its use is recommended both in health and in sickness'.[18] All pure and unmixed wine, according to Dioscorides, is nutritious and wholesome; counters poisons, bites, and stings; improves 'distention and loosening of the stomach or bowel'; and helps 'people who perspire and are weakened'.[19]

Moving to the blended beverages, wine prepared with honey, termed *melitites*, 'is given in cases of chronic fevers to those who have a weak stomach…and it is suitable for arthritics, nephritics, and for those of weak constitution'.[20] Dioscorides defines *melitites* as a mixture of must, honey, and salt, and differentiates this from

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[16] It shall be noted if a fruit other than or in addition to grapes is used to produce a beverage.
[17] Nelson, The Barbarian's Beverage, p. 2.
[18] Dioscorides, V.6, pp. 333-7.
[19] Ibid.
[20] Ibid, V.7, p. 337.

oinomeli, a combination of dry wine and a little honey. On mead, known as either *melicraton* or *hydromeli*, Dioscorides writes that it is useful for people 'who are sickly, who cough, who have lung inflammations, and who are weakened from perspiration' as well as 'those with stomach problems or rheums or [those] who have no appetite'.[21] Dioscorides then continues with the descriptions of wines made from a range of different fruits, including quinces, pears, pomegranates, dates, and figs, and flavoured with various additives, such as resins, pine cones, or particular herbs and spices. He provides instructions for their preparation and information on their properties. Several entries focus on wines made exclusively for a particular medical purpose, such as entries 55, 'wine for headcolds', and 67, 'abortifacient wine'.[22]

Wine, mead, and combinations of the two were therefore seen as substances fundamentally linked to health: while too much could result in unpleasant side effects, these beverages, when consumed in moderation, were understood to have many medicinal properties. Dioscorides' prolix commentary on fruit- and honey-based alcohols certainly contrasts with his brief and highly negative presentation of the two types of beer noted above. His descriptions of all of these beverages, and the general attitudes they represent, were to play a major role in influencing later Greek and Roman medical authors alike.

Prejudice against beer and beer-drinkers can be seen in other types of writing, too, reinforcing and repackaging the stereotypes about foreigners and their odd tastes. Tacitus, a Roman senator and historian active in the late first and early second centuries, composed an ethnographic work on the Germanic peoples living beyond the empire, *Germania*. In chapter 23, Tacitus describes their drinking habits, writing that 'for drink they use the liquid distilled from barley or wheat, after fermentation has given it a certain resemblance to wine'.[23] He also records that some tribes buy wine from their Roman neighbours and notes their overindulgence when it comes to alcohol:

[21] Ibid, V.9, p. 338.
[22] Ibid, V.55, p. 353; V.67, p. 355.
[23] Tacitus, *Germania*, in *Agricola. Germania. Dialogue on Oratory*, ed. and trans. M. Hutton and W. Peterson (Cambridge, MA, 1914), pp. 166-7: *Potui humor ex hordeo aut frumento, in quandam similitudinem vini corruptus.*

‘if you humour their drunkenness by supplying as much as they crave, they will be vanquished through their vices as easily as on the battlefield’.[24] While Tacitus’ comments on beer itself are not overly negative, he does seem to judge the barbarians’ intemperance as inferior to the ‘civilised’ Roman approach to alcohol.

Pliny records information on beer and beer-drinkers in his encyclopaedic *Natural Histories*. Noting that ‘the nations of the west also have their own intoxicant, made from grain soaked in water’, he cites Spain, Gaul, and Egypt as specific regions that produced beer.[25] Like Tacitus, his basic presentation of beer remains neutral, but the character of those who drink this alcohol is again critiqued, as Pliny remarks that ‘in no part of the world is drunkenness ever out of action, in fact they actually quaff liquors of this kind neat and do not temper their strength by diluting them, as is done with wine…Alas, what wonderful ingenuity vice possesses! A method has actually been discovered for making even water intoxicated!’[26] Thus, in contrast to the medical texts, which found problems with the substance of beer itself, writings outside of the medical arena seem to take issue instead with the beer-drinkers, disapproving of their apparent tendency to overindulge in alcohol.

As noted in Chapter 2, Pliny included a large amount of medical advice and hundreds of remedies in his encyclopaedia. Despite this vast range of medical material, he never addresses the potential medical properties of beer or lists it as an ingredient. Just as with Dioscorides, the contrast with wine, mead, and mixed alcoholic beverages is stark. Pliny, too, does not hide the potential dangers of consuming these drinks in excess, but does recommend their use in many treatments. I recorded 159 references

[24] Tacitus, Germania, pp. 166-7: si indulseris ebrietati suggerendo quantum concupiscunt, haud minus facile vitiis quam armis vincentur.

[25] Pliny, *Natural History*, IV, 14.149, pp. 284-5: *Est et occidentis populis sua ebrietas fruge madida, pluribus modis per Gallias Hispaniasque, nominibus aliis sed ratione eadem. Hispaniae iam et vetustatem ferre ea genera docuerunt. Aegyptus quoque e fruge sibi potus similis excogitavit…*

[26] Pliny, Natural History, IV, 14.149, pp. 284-5: *nullaque in parte mundi cessat ebrietas; meros quippe hauriunt tales sucos nec diluendo ut vina mitigant; at, Hercules, illic tellus fruges parare videbatur. heu, mira vitiorum sollertia! inventum est quemadmodum aquae quoque inebriarent.*

to mead and/or honey-wine in the *Natural History*. The terms used by Pliny include *mulsum*, *aqua mulsa*, *hydromel*, *melitites*, and *thalassomel* (a mixture of seawater and honey, possibly fermented). Most of these cases represent remedies, though some are full descriptions of the substances in question. In Book 24, for example, Pliny writes that 'if [fenugreek] is boiled down with mallows, and honey wine (*mulso*) be afterwards added, a draught is praised as a preeminent remedy for troubles of the uterus and intestines'.[27] He notes that 'for pain of the kidneys or liver [bugloss] is taken in hydromel (*aqua mulsa*), should there be fever, otherwise in wine'.[28] Although beer was not deemed by Pliny to have medical properties, other cereal-based products, such as bread, were recorded in treatments: 'in hydromel (*aqua mulsa*), [bread] is very soothing to indurations'.[29] Thus, in Pliny's eyes, beer was seen to be useless, whereas other cereal-based products as well as alcohols derived from fruits and honey possessed medicinal properties. This particular disapproval of beer, whether it was seen as an actively harmful substance or as related to uncouth barbarians, left its mark for centuries and continues to influence the stereotypes surrounding beer- and wine-drinking today.

Changing tastes in late antiquity?

Although beer may have been looked on as an inferior drink consumed by foreigners, many of those 'foreigners', such as Gauls and Egyptians, lived within the bounds of the Roman Empire. Additionally, while the Germanic tribes mentioned by Tacitus mostly remained beyond the *limes* for a few more centuries, they were a constant presence on the frontier and an increasing force within the army. Although sources indicate that many Romans continued to disapprove of beer, interactions with beer-drinking cultures appear to have resulted in a softening of some of the extreme views of earlier writers. To be clear, as Nelson notes, 'this did not mean that beer came

[27] Pliny, Natural History, VII, 24.187, pp. 130-1: si vero cum malva decoquatur postea addito mulso, potus ante cetera vulvis interaneisque laudatur.
[28] Pliny, Natural History, VI, 22.52, pp. 328-9: et in dolore renium aut iocineris ex aqua mulsa, si febris sit, sin aliter, e vino bibitur.
[29] Pliny, Natural History, VI, 22.138, pp. 392-3: ex aqua mulsa duritias valde mitigat.

to be thought of as a drink equal to wine', though it seems to have achieved some degree of acceptability in the provinces.[30] Medicine is a field in which this changing attitude can be discerned, if only slightly. While Dioscorides attached no medicinal properties to beer, instead considering it to be harmful, and Pliny entirely ignored the drink from a medical perspective, a handful of late antique Latin authors do comment on beer in medical contexts.

The *Medicina Plinii*, noted in Chapter 2 as an example of the late antique reworking of existing texts, is made up of three books of remedies. As its name suggests, much of the material is derived from Pliny's *Natural History*, though other influences can also be seen.[31] Book three contains a chapter on scrofulous, swollen glands; the tenth and final recipe of this chapter recommends that the leaves of elder be ground up and mixed with the dregs of beer and then applied with a linen cloth.[32] The edition of the text prepared by Alf Önnerfors lists 560 individual recipes within the three books; the use of beer dregs to help scrofulous swellings is the single reference to beer in the entire text. In other words, beer appears in 0.18% of remedies. Wine, in contrast, appears in roughly 20% of recipes, though the exact number fluctuates between chapters. Despite this seemingly insignificant representation of beer, the sheer fact that it is included in a remedy is significant, marking a departure from earlier Mediterranean medical writings and confirming that sources other than Pliny's *Natural Histories* were incorporated in the *Medicina Plinii*.

Marcellus of Bordeaux, a Gallo-Roman statesman active in the late fourth and early fifth centuries, composed *De medicamentis liber*, a large collection of recipes arranged *a capite ad calcem*.[33] Although he cites both 'Plinies', meaning Pliny the

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30 Nelson, The Barbarian's Beverage, p 74.

31 Plinii Secundi Iunioris qui feruntur de medicina libri tres,; Doody, 'Authority and Authorship in the Medicina Plinii', pp. 93-105; Doody, Pliny's Encyclopedia.

32 Plinii Secundi Iunioris qui feruntur de medicina libri tres, III.6.10, p. 71: ebuli folia conteruntur et mixta cum faece ceruisiae super additis foliis eiusdem ebuli in linteolo alliga<n>tur.

33 Marcellus, *De medicamentis liber*, 2 vols, ed. E. Liechtenhan, trans. J. Kollesch and D. Nickel, Corpus Medicorum Latinorum V (Berlin, 1968); Stannard, 'Marcellus of Bordeaux and the Beginnings of Medieval Materia Medica', pp. 47-53.

Elder's *Natural History* and the *Medicina Plinii*, as sources, it is clear that a wider range of material influenced his work.[34] In particular, his local, Gallic environment appears to have left a strong imprint, in both his writing style and the medical information recorded within the text.[35] Remembering that many of the classical sources connected Gaul with beer-drinking, it might be expected to see this beverage appear alongside wine, mead, and mixed alcohols. This conjecture is correct: beer appears in two remedies and both are distinct from the single instance recorded in the *Medicina plinii*. First, in Chapter 16, on coughs and lung conditions, Marcellus suggests drinking a potion of salt dissolved in beer.[36] Chapter 28, on worms and intestinal issues, provides the second example, where beer appears to be a liquefying agent in which a compound medicine is soaked.[37] Of particular note in this case, however, is that Marcellus comments on what to do if the reader finds him- or herself in a province in which beer is not available: instead use water in which myrtle has been cooked.[38] While these two recipes double the total seen in the *Medicina plinii*, *De medicamentis liber* contains 2513 recipes. Consequently, beer appears in 0.08% of recipes.

These examples of late antique medical authors recording beer in their remedies may seem trivial at first glance, representing a minute increase over their classical predecessors. Slight as this increase is, however, it still indicates a change, moving from the outright disapproval of beer in classical texts to its potential consideration in late antique contexts. In the case of Marcellus, the provincial environment in which he was writing may have played an important role in his

[34] Doody, Pliny's Encyclopedia, p. 138.
[35] Stannard, 'Marcellus of Bordeaux and the Beginnings of Medieval Materia Medica', p. 49.
[36] Marcellus, De medicamentis liber, 16.33, pp. 126-7: Salis quantum intra palmam tenere potest qui tussiet in potionem ceruisae aut curmi mittat et calidum bibat, cum dormitum audit, neque postea loquatur, sed tacitus somnum capiat; cito sanabitur, si hoc uel triduo fecerit.
[37] Ibid, 28.13, p. 221: …Facies pilulas magnitudine ea, qua ano inici possint, ipsasque factas infundes in ceruesiae nouae sextariis duobus et mellis cyatho.
[38] Ibid: Quod si in ea prouincia faciendum fuerit hoc medicamentum, in qua ceruisia non est, ex aqua dabis, in aut myrta cocta sit, ad sextarios duos aut cum sapae mixtae sextariis duobus atque ex eo temperabis potionem et dabis bibendam…

acceptance, however small, of the medicinal qualities of beer. These initial inclusions of beer in medical writings appear to have paved the way for early medieval medical writers.

Early medieval medicine: The rise of beer and *medus*

The opening examples from csg. 752, a handful of remedies and dietary guidelines citing beer, mead, and wine, suggest that the changing attitudes towards alcohols seen in late antiquity continued to develop over the following centuries. Four aspects of this example stand out, marking a departure from the classical and late antique medical writings reviewed above. First, and perhaps most obviously, the increasing proportion of references to beer is noteworthy: it is mentioned twice in this small selection of material. The first example comes from the fifteenth remedy, where it is recommended that beer and mead be avoided during the patient's recovery. Beer is also noted as an exception in the list of foods and drinks to avoid if suffering from paralysis: light beer is considered acceptable. While beer is not recorded as an ingredient in recipes in this manuscript, its appearance in two types of dietary guidelines still places it within a medical environment. Secondly, the references to beer, mead, and wine are presented neutrally and beer sits as an equal with wine and mead. Although in one case beer and mead should not be consumed whilst recovering, this is not in preference to wine but only to water. Furthermore, where mead is recorded in this manuscript, it is always written as *medus* as opposed to any of the terms noted above, such as *mulsum*, *aqua mulsa*, *melicraton*, or *melitites*. Finally, all of the references to alcohols come from unattributed medical material given the selection criteria involved in the manuscript sample. Therefore, although neither beer nor *medus* appear as ingredients in remedies in this manuscript, the references to these beverages are highly significant.

Turning to the rest of the manuscript sample, additional examples of beer and *medus*, both in dietary guidelines and as ingredients within recipes, suggest the increasing acceptance of beer as well as several other linked developments. In total, I have recorded twenty-nine references to beer and nine references to *medus* in the sections of text I transcribed. From these examples, beer appeared as an ingredient in twenty recipes and as a drink recommended for consumption or avoidance in nine dietary guidelines (some of which, it must be remembered, are located within remedies), while *medus* appeared as an ingredient twice and in dietary guidelines seven times. I shall review the beer examples first.

1. Beer

None of the early medieval recipes that include beer appears to have been derived from the recipes listed in either the *Medicina plinii* or *De medicamentis liber*. Within these twenty cases, however, two recipes are repeated, suggesting the existence of shared sources that have not survived or the inheritance of a common tradition. Csg. 44 and csg. 751 both present a remedy intended to expel 'serpents and other worms' that uses the juice of wild cucumber mixed with fresh beer.[39] An earlier remedy in csg. 751 offers the same treatment, but is labelled as a cure for haemorrhoids, *Ad fico*; perhaps the combination of wild cucumber and beer was used to treat multiple maladies or perhaps the scribe added the wrong recipe at this point in the manuscript.[40] Another case of parallel treatments can be seen in csg. 44 and BAV pal. lat. 1088. This remedy, intended to help 'hardness of the stomach', combines flax seeds and honey in beer.[41] Taking the repeated remedies into account, the manuscript sample records eighteen distinct recipes that use beer as an ingredient; these eighteen remedies are unknown in classical and late antique sources, representing a notable increase in the use of beer as a medicinal ingredient over the previous periods.

[39] Csg. 44, p. 364: **Ad serpentes** . uel alios uermes . de homine . expellendos . Potio probata . ius de cocurbita saluatica . nuce plena cum nouella ceruisia ieiuno dabis bibere luna decurrite. Csg. 751, p. 423: **Ad serpentes uel alios uerme de omine expellendum potio probata** Ius de cocurbita siluatica nucae plena cum nouella ceruisa ieiuno bibere dabis luna decurrente.
[40] Csg. 751, p. 413: Item (De fico) cucurbita saluatica nuce plena cum molle ceruisa dabis diebus supra dictis.
[41] Csg. 44, p. 366: **Item . Ad duritiam uentris** . Lino semen cum mel tritum . in ceruisa . ieiunus bibat mirum . est; BAV pal. lat. 1088, f. 40^{v}: item ad duritiam uentris lini semen cum mel tritum in ceruisia ieiunus bibat mirum est.

The raw data, however, must be contextualised within the bigger picture. The transcribed texts produced over four thousand individual recipes, meaning that twenty remedies incorporating beer form but a very small percentage of the total (0.46%). Indeed, the frequency with which beer is mentioned may look fairly similar to the late antique examples addressed above: beer appears in less than 1% of the recipes in all cases (occurring in 0.46% of the recipes from this dissertation's manuscript sample, 0.08% of the recipes of Marcellus, and 0.18% of the recipes from the *Medicina plinii*). Yet as insignificant as these numbers may seem, the percentage of early medieval medical recipes mentioning beer is more than double the percentages of the late antique texts.

Given that the manuscripts included in the sample were composed in a range of different scriptoria, they are each likely to contain a unique blend of sources. With this in mind, it is noteworthy that many of the references to beer come in clusters. The eleven recipes involving beer in csg. 44, for example, a manuscript containing 850 individual unattributed recipes spread from pp. 186-368, are all found on pp. 345-66. This page range means that, within csg. 44, remedies using beer are found exclusively in two MMCs, the collections on pp. 337-54 and 354-68. These two collections hold a total of 562 recipes; the eleven remedies with beer, totalling 1.96% of these recipes, thus represent the highest percentage of remedies with beer recorded so far. Yet this analysis can be taken one step further: nine of the eleven recipes are found within the first MMC on pp. 337-54. This MMC contains 247 recipes, meaning that the nine examples of beer represent 3.64% of the recipes in the collection. A comparison of the frequency with which beer is recorded in this MMC and the late antique texts is particularly revealing: the occurrence of beer in 3.64% of the MMC's recipes represents an increase of over twenty-fold and nearly fifty-fold in relation to the *Medicina plinii* and *De medicamentis liber*, respectively. When the textual groups are analysed in depth and broken into their constituent parts, rather than assessed as a whole, the results become more significant. This increase, both in raw numbers and percentage, suggests that some of the medical knowledge recorded in this manuscript, and specifically the source(s) used to create this MMC, is distinct from classical medical traditions.

2. MEAD

As noted above, all references to mead in the sections of text I analysed in csg. 752 use the term *medus*, while the classical Latin and Latinised Greek terms *mulsum*, *aqua mulsa*, *hydromel*, *oenomel*, and *melitites* are absent. The *Etymologies* of Isidore of Seville, an encyclopaedic text written in Visigothic Spain in the early seventh century, provides information on a variety of alcohols containing honey and represents one of the earliest written sources to use the term *medus*.[42] Isidore first distinguishes between *hydromel* and *oenomel*, classifying the former as a combination of honey and water and the latter as a mixture of honey and wine.[43] *Mulsum* and *melicratum*, on the other hand, seem to be more variable in their composition: *mulsum*, for example, is recorded as both 'wine mixed with honey' and 'a drink made from water and honey'.[44] In contrast, *medus* alone is said be made from honey with no comments referring to the addition of other liquids.[45] This suggests that, unlike many of the other beverages listed above which may represent honey-wine or mead-wine mixtures, *medus* may have been a honey-based alcohol more similar to a modern understanding of mead. Indeed, the word *medus* is related to the English word 'mead', as both stem from a proto-Germanic root.[46] By comparison, 'mead' was known as *me(o)du* in Old English and *metu* in Old High German, while the modern equivalents in Dutch and German are *mee* and *Met*, respectively. Thus, while it is unclear if the term *medus* documents a different type of honey-based alcohol, the term itself can be connected to a Germanic tradition.

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[42] Isidore of Seville, *Isidori hispalensis episcopi: Etymologiarum sive originum, libri XX*, 2 vols, ed. W. M. Lindsay (Oxford, 1911); Isidore of Seville, *The Etymologies of Isidore of Seville*, trans. S. A. Barney, W. J. Lewis, J. A. Beach, and O. Berghof, (Cambridge, 2006).
[43] Isidore of Seville, The Etymologies of Isidore of Seville, 20.3.11-12.
[44] Ibid, 20.3.10.
[45] Ibid, 20.3.13.
[46] A. Stevenson (ed.), *Oxford Dictionary of English* (Oxford, 2010).

The presence of *medus* in medical contexts did not result in the disappearance of the other terms for alcohols involving honey: I recorded twenty-three examples of *hydromel*, one example of *melicratum*, 119 examples of *mulsum* or *aqua mulsa*, and two examples of *oenomel* in the manuscript sample. Indeed, the word for 'mead' in many romance languages has descended from one of the classical terms to describe mead, *hydromel*. Eventually, however, as the above etymologies indicate, this classical vocabulary would be largely lost from Germanic languages, such as English, Dutch, and German.

Significantly, the contexts in which the term *medus* is found are almost entirely unlike those in which the other terms are located, suggesting a difference between their uses and/or sources. First, as noted above, seven of the nine references to *medus* occur within dietary guidelines, such as those seen in the examples from csg. 752. *Medus* is only included as an ingredient in recipes twice, and both instances come from the same manuscript, csg. 751. On p. 305, *medus* is recommended as part of a treatment for bladder pain and difficulty urinating, while on p. 413 it appears in a recipe titled *Potio ad oua colobrina*, a potion intended to expel worms and other *maleficia*, or sources of harm.[47] The relative frequency with which *medus* appears in dietary guidelines and its few appearances as an ingredient in remedies contrasts sharply with the contexts in which the other terms for honey-based beverages are found. In nearly all cases, *mulsum*, *aqua mulsa*, *melitites*, *oenomel*, and *hydromel* are mentioned as ingredients within recipes or listed *as* recipes themselves. Csg. 759, for example, provides two recipes that offer instructions on how to produce *hydromel*.[48]

Secondly, *medus* is often recorded alongside beer. The two beverages are paired in all seven of the dietary guidelines containing mead. In fact, the two remedies that use *medus* are the only occasions in which it is mentioned without reference to beer, and all but two of the dietary guidelines involving beer also include *medus*. While some of these guides were based on rebalancing humours when suffering from a

[47] Csg. 751, pp. 304, 413.
[48] Csg. 759, pp. 66, 88-9.

particular condition, such as the example in csg. 752 listing the foods from which to abstain if paralysed, other guides were intended to maintain humoral balance and thus advocated for the avoidance or consumption of specific food and drink at certain times of the year. Calendrical guides to diet linking beer and *medus* can be found in Paris BnF lat. 2849A and csg. 759. In the entry for the month of May, Paris BnF lat. 2849A suggests that beer and *medus* should be avoided, but recommends drinking beverages made from wormwood and fennel.[49] For August, csg. 759 likewise instructs its readers to avoid beer and *medus*, though the text does not provide alternatives.[50] Csg. 759 also includes one of the two references to beer without the accompanying *medus* in a dietary guide, though it must be noted that this recommendation (that beer should be avoided in June), has been inserted into the text; given the tight spacing of an interlinear insertion, perhaps the scribe simply ran out of room to include a reference to *medus*.[51] Overall, the consistent pairing of the two beverages may reflect their original connection in an earlier dietary treatise now lost to us.

While classical texts offer no information on a possible link between the two substances, a late antique letter on diet, Anthimus' *De observatione ciborum*, may shed light on the topic. Anthimus, a Byzantine physician active in the sixth century, was exiled to the West during a period of political intrigue in Constantinople. While acting as an ambassador of Theodoric, king of the Ostrogoths (r. 493-526), Anthimus composed a letter on diet in honour of his host Theuderic, king of the Franks (r. 511-34) in the area around Metz.[52] The letter fuses Greek, Roman, and Frankish cultural and dietary traditions, offering the reader advice on how to maintain good health through the observance of a healthy diet. In Chapter 14, for example, Anthimus discusses the medical powers of raw bacon, at least as reported in Frankish medical traditions. He writes, 'as for raw bacon which, so I hear, the Franks have a habit of

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[49] Paris BnF lat. 2849A, f. 23[v]: Ceruisa nec met<u>us</u> non bibat absentio et faniculo bibat.
[50] Csg. 759, p. 8: ceruissa et metus non bib<u>at</u>.
[51] Csg. 759, p. 8: aqua bibere \ceruissa n<u>on</u> bibere/ nisi pusca usitare lactucas manducare acetu<u>m</u> bibere.
[52] M. Grant, 'Introduction', in Anthimus, *On the Observance of Foods*, ed. and trans. M. Grant (2nd edn) (Totnes, 2007), p. 12.

eating, I am full of curiosity regarding the person who showed them such a medicine as to obviate the need for other medicines...Look at what power there is in raw bacon, and see how with it the Franks heal what doctors try to cure with drugs or with potions'.[53] While bacon may seem entirely unrelated to the beverages under consideration, the location of this discussion is significant: the description of the particularly Frankish bacon-eating and medicating traditions occurs immediately before the entry detailing beer and mead. On these beverages, Anthimus comments that 'beer, plain mead and spiced mead are absolutely fine for drinking by almost everyone. Beer that is well brewed possesses goodness and surpasses expectation…Mead that is well brewed is very beneficial, provided that the honey is good'.[54] Like the references to mead in the dietary guidelines assessed in the manuscript sample, Anthimus uses the term *medus*.

De observatione ciborum, through its detailed depiction of certain Frankish practices and references to oral traditions (such as the medicinal properties of bacon), indicates that Anthimus picked up this information through personal experience. The paired description of beer and *medus* may therefore reflect that these beverages were traditionally viewed as linked in Frankish customs, explaining their continued coupling in Carolingian writings on diet. Alternatively, Anthimus may have initiated the pairing of these two alcohols, and their consistent linkage in later texts may simply reflect the influence of *De observatione ciborum* on eighth- and ninth-century authors.

3. Summary

Ultimately, these results suggest that a subtle but significant shift occurred in the early medieval West. The recipes and other medical writings analysed above

[53] Anthimus, On the Observance of Foods, 14, p. 56-7: De crudo uero larido quod solent, ut audio, Franci comedere, miror satis quis illis ostendit talem medicinam ut non opus habeant alia medicina...ecce quale beneficium in larido crudo, et quod medici cum medicamentis uel potionibus temptant sanare uel emplastris curare, de larido crudo Franci sanant.
[54] Ibid, 15, p. 56-7: cervisa bibendo et medus uel aloxinum quam maxime omnibus congruum est ex toto, quia ceruisa, quae bene facta fuerit, beneficium habet et rationem praestat…similiter et de medo bene facto, ut mel bene habeat, multum iuuat.

document an increased presence of beer in medical contexts as well as the use of the term *medus* for mead. That beer, mead (under any name), and wine appear to be treated similarly, or at least without prejudice, also marks a notable change. The medical knowledge recorded in eighth- and ninth-century manuscripts must now be considered within the wider context.

Contextualising beer and mead in early medieval Europe

While the evidence from classical sources suggests that beer was being produced in parts of western Europe, does contemporary Carolingian evidence confirm its continuation? Writings like the *Etymologies* of Isidore of Seville point to brewing as an alternative to wine in regions that could not sustain viticulture.[55] Since much of the Frankish Empire covered areas that could support both grape and cereal production, do non-medical texts suggest that multiple beverages coexisted or that, just as in the classical world, a particular class of alcoholic beverages was privileged over others? Legal evidence, such as the *Capitulare de villis*, can help to address these questions.

This capitulary, composed in the late eighth century, concerns the management of royal estates.[56] While its seventieth and final chapter was highlighted in Chapter 2 of this dissertation in relation to its list of plants to be grown in gardens, the production of beer and wine is addressed in other chapters. Chapter 8 focuses exclusively on wine, detailing the care of vineyards as well as wine production, shipping, and the general supply of wine on royal estates.[57] The maintenance and cleanliness of wine-presses is

[55] Isidore of Seville, The Etymologies of Isidore of Seville, 20.3.17-18.
[56] *Capitulare de villis*, *MGH Cap.*, no. 32, pp. 82-91; Loyn and Percival, *The Reign of Charlemagne*, pp. 64-73.
[57] *Capitulare de villis*, *MGH Cap.*, no. 32, 8, pp. 82-91: *Ut iudices nostri vineas recipiant nostras, quae de eorum sunt ministerio, et bene eas faciant et ipsum vinum in bona mittant vascula et diligenter praevidere faciant, quod nullo modo naufragatum sit; aliud vero vinum peculiare conparando emere faciant, unde villas dominicas condirigere possint. Et quandoquidem plus de ipso vino conparatum fuerit quod ad villas nostras condirigendum mittendi opus sit, nobis innotescat, ut nos commendemus qualiter nostra fuerit exinde voluntas. Cippaticos enim de vineis nostris ad opus nostrum mittere faciant. Censa de villis nostris qui vinum debent, in cellaria nostra mittat.*

also mentioned in Chapters 41 and 48. The significance of brewing is illustrated in Chapter 61, which states that master-brewers should be attached to stewards, following their movements while on service to ensure that good beer is available.[58] Brewers are also classed among the essential workmen to have in each district; other professions listed include shoemakers, carpenters, blacksmiths, and fishermen.[59] Although the production of mead and the keeping of bees is not explicitly described by the capitulary, both mead and honey (with *medus* used to describe mead) are mentioned in several chapters, including Chapter 34, which asks that particular care is taken when making products to eat or drink, indicating that mead and honey were, in fact, being produced, as well.[60]

The *Plan of St Gall*, another manuscript mentioned in Chapter 2 in relation to gardens, also contains information on the production of alcohols in the Carolingian world. In particular, the diagram highlights the centrality of brewing within a monastic complex. Three separate breweries are depicted in the *Plan*, corresponding to individual brewing areas for the monks, distinguished guests, and pilgrims.[61] In the granary, storage areas for cleaned and malted cereal are recorded, while a drying kiln, mortars, and milling areas were all located nearby.[62] Conveniently, this brewing production area was situated near the cooper, who would have been responsible for constructing the barrels in which the beer would have been kept.

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[58] Ibid, 61, pp. 82-91: *Ut unusquisque iudex quando servierit suos bracios ad palatium ducere faciat; et simul veniant magistri qui cervisam bonam ibidem facere debeant.*

[59] Ibid, 45, pp. 82-91: *Ut unusquisque iudex in suo ministerio bonos habeat artifices, id est fabros ferrarios et aurifices vel argentarios, sutores, tornatores, carpentarios, scutarios, piscatores, aucipites id est aucellatores, saponarios, siceratores, id est qui cervisam vel pomatium sive piratium vel aliud quodcumque liquamen ad bibendum aptum fuerit facere sciant, pistores, qui similam ad opus nostrum faciant, retiatores qui retia facere bene sciant, tam ad venandum quam as piscandum sive ad aves capiendum, necnon et reliquos ministeriales quos ad numerandum longum est*.

[60] Ibid, 34, pp. 82-91: *Omnino praevidendam est cum omni diligentia, ut quicquid manibus laboraverint aut fecerint, id est lardum, siccamen, sulcia, niusaltus, vinum, acetum, moratum, vinum coctum, garum, sinape, formaticum, butirum, bracios, cervisas, medum, mel, ceram, farinam, omnia cum summo nitore sint facta vel parata*.

[61] Nelson, The Barbarian's Beverage, p. 103.

[62] Ibid, pp. 103-4.

The *Capitulare de villis* and *Plan of St Gall* therefore provide evidence for not only the presence of beer, mead, and wine during the Carolingian period, but also their production within its territories. This indicates that all of the beverages addressed above and seen in medical texts could have been locally sourced within the Frankish Empire, a topic intrinsically linked to the question of practicality.[63]

Conclusion

The results presented above demonstrate several key features. First, a long-term transition towards the acceptance of beer for medical purposes can be seen through the changing portrayal of the beverage and its gradual increase in recipes. Secondly, the recipe literature documents the introduction of a new type of (or at least new term for) mead in medical contexts: *medus*. Third, these two developments appear to be linked, with beer and mead (as *medus*) often found together. The relationship between the two is further strengthened by their connections to Frankish traditions, highlighted by Anthimus' *De observatione ciborum*. Fourth, although wine continues to appear more frequently than either beer or mead, it is important to recognise that they are presented on equal terms: each of these beverages is listed in recipes as well as dietary guidelines. In contrast to classical sources, beer is not dismissed as unhealthy, uncouth, or otherwise unsuitable for medical purposes in this textual sample.

The significance of each of these changes must be considered in context. The recipes involved in this dissertation, based on the selection criteria outlined in Chapters 1 and 2, have not been attributed to earlier sources. While many of the treatments may be related to classical or late antique recipes, they also exhibit the influence of material beyond these traditions: this chapter reveals that locally produced ingredients unrecorded in classical texts were included in recipes. The origins of this medical

[63] It must be remembered that, although many of the manuscripts involved in this study were written within Carolingian Francia, others were composed beyond the Frankish heartlands. It is known, however, that a number of these manuscripts, including csg. 44, noted above, were written in northern Italy and then moved further north soon after their composition, speaking to the strong cultural and intellectual links between these areas.

knowledge, without identifiable sources, is open to speculation: could it represent an innovative Carolingian monk actively experimenting in the monastic garden and incorporating alcohols made on site? This option seems unlikely. The similarities seen in many manuscripts suggest that the medical information contained within these texts was part of a larger pattern. I argue that the inclusion of local, non-classical ingredients suggests a widespread, practical development related to the availability of ingredients. The appearance of beer and *medus* thus speak to the active engagement with and adaptation of medical knowledge during this period.

This chapter also showcases the importance of large sample sizes and in-depth textual analyses. Such detailed studies have the potential to identify significant patterns in the data that could be missed in studies with smaller textual samples, such as a single remedy collection. By analysing over 4000 recipes, it was possible to detect particularly significant data clusters and follow large-scale analyses with individual case studies: the observation that references to beer in early medieval recipes represented an increase over late antique writings was accentuated when the dataset was broken into its constituent parts. While beer was listed in less than 0.5% of recipes from the entire manuscript sample, it was included in nearly 2% of the recipes in the MMCs of csg. 44. This percentage increased even further when the MMCs were considered separately: nine of the recipes that record beer can be found in the first MMC of csg. 44 (pp. 337-55), representing close to 4% of the 297 treatments contained within this collection. The inclusion of beer in such a relatively high number of recipes indicates that this MMC drew on non-classical sources of information, such as a familiarity with local conditions. Therefore, as illustrated by, on the one hand, the observation of a general increase in references to beer, and, on the other hand, the identification of a concentration of local ingredients in the first MMC of csg. 44, the analyses involved in this dissertation have the potential to uncover both large-scale patterns as well as very specific information.

Finally, despite the series of changes in the recipe literature revealed through this study, it must be remembered that the texts in which the examples of beer and *medus* were identified continue to share many features with classical and late antique medical writings. The introduction of these ingredients cannot be said to mark a sharp break in intellectual traditions, but rather the evolution of the medical knowledge in circulation. I argue that the developments noted above, though limited in scale, reflect two significant changes: a) that the compilers of recipe collections were open to incorporating non-classical *materia medica*, and b) that these changes were of a highly practical nature. The supporting evidence, such as the *Capitulare de villis* and *Plan of St Gall*, indicates that the alcoholic beverages recorded in remedies were being produced in the Carolingian world, thereby reflecting the introduction of very practical substances. The addition of such practical ingredients suggests that these collections were intended to be used in the practice of medicine. Ultimately, based on the evidence generated by this study, I argue that the individuals responsible for the composition of these texts worked with a body of knowledge largely descended from classical traditions but took into account practical considerations and adapted their collections to suit local conditions in order to produce recipe collections intended for use in therapy.

Chapter 4

Impossible Imports or Available Exotics? A Study of Non-Local Ingredients

> *Antidotum gira deacoloquintidis:*
> *Recipit hęc eringio radices polopodię radices sirobalsamo amomo piper longum meu gingiber gentiana brathea costo spico casia agarico agaro interiones ana dragmas ii scolopendria camitrius cafora ana untia i et dimidia aloę croco reopontico masticę cinamo diagridiu epithimo asaro pionia ana untia i omnia puluerem facis adde mel dispumatum quod sufficit*.[1]

Twenty-eight different ingredients are listed in the recipe above, the *Antidotum gira deacoloquintidis*, an antidote in BAV pal. lat. 1088 (see n. 1 for the full recipe, including the conditions it claims to treat and the instructions given for its preparation). Nearly all of the ingredients are derived from plants; honey (*mel*) and agaric (*agarico*), a mushroom, are the only exceptions. I have classified ten ingredients as grown or

[1] BAV pal. lat. 1088, f. 90^{r}. I only included the recipe's ingredient list in the opening quotation; the full entry begins with the conditions the antidote treats and ends with instructions for its preparation: *Antidotum . gira . deacoloquintidis . facit . ad uertiginem . et dolorem capitis . epilenticis qui subito angustia incurrit ad dolorem . pectoris et qui de nigra colera laborant pleoreticis et ad malas humores indegestibiles stomaticis . epaticis . et uentris dolorem colicis et qui longam egritudinem habent . eruginosis . et qui malam colorem habent neufetricis . et qui grauitudine corporum habent . idropicis et qui subito grauantur . tisicis . podagricis . incipientis mulieribus uitia . et corruptela uentris intrinsecas rupturas curat . sine molestia soluit . omni temporem . accipienda est . non solum presentes infirmitates curat . sed futuras egritudines defendit . Recipit hęc . eringio radices . polopodię radices . sirobalsamo amomo . piper longum . meu . gingiber . gentiana . brathea . costo . spico . \casia . / agarico . agaro . interiones . ana . dragmas . ii . scolopendria . camitrius . cafora . ana untia . i . et dimidia . aloę . croco . reopontico . masticę . cinamo . diagridiu . epithimo . asaro . pionia . ana untia . i . omnia puluer[a]\e/m facis adde mel dispumatum quod sufficit . terendo commiscis in buxtea reponis . da exinde prima die cum aqua calida scripulos . iii . alia die . scribulos . ii . tertia die scripulum i . si uelis uentrem bene purgare da exinde dragma . i . scamunia scripulum . i . ista gira . est aloetica . et est maior et melior et suauior in omnibus utilior quia per hanc antidotum omnes egritudines minuantur.*

produced in northern and western Europe, including eryngium (*eringio*), polypody (*polopodię*), spignel (*meu*), gentian (*gentiana*), savin (*brathea*), agaric (*agarico*), rustyback fern (*scolopendria*), dodder (*epithimo*), hazelwort (*asarum*), and honey (*mel*); five as semi-exotic (generally native to the southern and/or eastern Mediterranean), including sweet flag (*agaro*), colocynth (*interiones*), wall germander (*camitrius*), scammony (*diagridiu*), and peony (*pionia*); and thirteen as exotic, including balsam bark (*sirobalsamo*), Nepal cardamom (*amomo*), long pepper (*piper longum*), ginger (*gingiber*), costus (*costo*), spikenard (*spica*), cassia (*casia*), camphor (*cafora*), aloe (*aloe*), saffron (*croco*), rhubarb (*reopontico*), mastic (*mastice*), and cinnamon (*cinamo*). Although this approximate classification could be debated (had sweet flag, for example, been introduced to western European wetlands and riversides by the Carolingian period? Were peonies being cultivated in monastic gardens?), it reveals that this recipe relies on a combination of locally available ingredients and exotic substances.[2] While the distance the exotic ingredients would have travelled varies (some of the plants, such as wall germander or colocynths, could have grown in neighbouring regions, whereas other products, including camphor, cassia, and Nepal cardamom, are native to southeast Asia), it is apparent that, if this antidote were used in practice, the majority of the substances must have travelled to reach the Frankish Empire.

Although some recipes rely exclusively on locally available ingredients, many present a similar picture to the antidote above, combining both local and exotic products. John Riddle's analysis of one of the MMCs involved in the present study, the recipe collection in csg. 44 covering pp. 228-55, provides a useful example.[3] He identified 361 different ingredients in this collection (using Henry Sigerist's 1923 transcription), some of which, such as fennel and rose, are also recorded in the texts on gardens noted in Chapter 2, whereas others, including camphor and ambergris, were unknown to classical physicians.[4] After eliminating ingredients used largely as

[2] Voigts, 'Anglo-Saxon Plant Remedies and the Anglo-Saxons', pp. 261-3.
[3] Riddle, 'The Introduction and Use of Eastern Drugs in the Early Middle Ages', pp. 185-98.
[4] Sigerist, *Studien und Texte*, pp. 78-99.

emollients, flavouring agents, or solvents, such as honey, wine, and wax, he delineates the twenty most frequently recorded ingredients, those listed in eight or more recipes: aloe (*aloes*), gum ammoniac (*ammonicum*), Nepal cardamom (*amomum*), parsley or celery seeds (*apium semen*), cinnamon (*cassia*), cumin (*ciminum*), colophony resin (*colofonia*), saffron (*crocus*), fenugreek (*fenugrecum*), frankincense (*libanus*), flax (*linum*), mastic (*mastice*), myrrh (*murra*), parsley (*petroselinum*), pitch (*picea*), pepper (*piper*), scammony (*scamonia*), storax (*storace*), terebinth (*terebintina*), and ginger (*zinziber*).[5] While seven of these ingredients could have been locally sourced, the remaining thirteen, nearly two-thirds of the ingredients in question, are not native to northern and western Europe. Like the opening antidote, there is a range of exoticness among the non-local products; a number of these ingredients, such as scammony and terebinth, can be found in the southern and eastern Mediterranean, whereas others, including cinnamon, pepper, and ginger, are grown much further away in southeast Asia. Is it probable (or even possible) that these ingredients were available in the Carolingian world? Is there evidence that speaks to the movement and trade of these particular spices, gums, resins, and woods? Or are there signs suggesting that Franks encountered difficulties in obtaining such non-local ingredients?

This chapter will explore the question of practicality by assessing exotic, non-local ingredients, approaching a very different type of substances than the previous chapter. After first reviewing evidence for the movement of exotic ingredients through gift exchange, trade, and even illicit means, I shall return to Riddle’s study. Riddle and others, such as Michael McCormick, have highlighted the appearance of camphor and ambergris in early medieval recipes, arguing that their use in remedies reflects the arrival of new pharmaceutical knowledge from the east. Using my significantly larger textual sample, I expand on their work, identifying not only additional examples of these two ingredients, but also the occurrence of a cluster of new products that appear to have travelled together as a distinct unit. By analysing the manuscript contexts in which this ingredient cluster is located and examining additional evidence concerning

[5] Riddle, ‘The Introduction and Use of Eastern Drugs in the Early Middle Ages’, pp. 187-9.

the trade of exotics, I present potential routes for the dissemination and spread of this pharmaceutical information as well as the possibility that it was linked to the movement of the substances themselves. Complementary documentary evidence suggests that these exotic products were, in fact, introduced to the west during this period. I therefore argue that recipes incorporating such ingredients integrated 'cutting edge' information, updating their recipe collections with new pharmaceutical knowledge. It must be remembered, however, that these *exotica* would have been available only sporadically, in limited quantities, and at great expense. Recipes including these substances were not, therefore, practical in the same way as those that introduced locally produced beverages (i.e., readily available ingredients that suited local conditions), but their inclusion reflects a scribal environment actively engaging with new ingredients and information: the findings of this case study suggest that such recipes were intended to be used if and when the necessary ingredients could be obtained.

Evidence for the movement of *exotica*

The example of Cynehard presented in Chapter 2 indicates that access to *exotica* was a major challenge in some parts of northwest Europe. In this case, Cynehard, Bishop of Winchester (d. *c*. 778), asked Lull, Bishop of Mainz (d. 786), to send exotic ingredients since many of the products listed in recipes were unavailable (and even unknown) in early medieval England.[6] The fact that he asked his Frankish colleague for help in supplying these ingredients does, however, suggest that the Carolingian world had better access to these types of ingredients (or at least that Cynehard thought this was the case).

The early medieval insular world provides another example of the challenges presented by attempting to procure these types of non-local substances. Willibald (*c*. 700-89), an English missionary and later bishop of Eichstätt, travelled to the Holy

[6] Wallis, *Medieval Medicine*, pp. 110-11; Cynehard, *Epistula* 114, *MGH Epistulae selectae* I, p. 247.

Land in the early eighth century. In the *Hodoeporicon*, the record of his life that, according to the preface, he dictated to the nun Huneberc, he describes smuggling balsam out of Tyre by concealing it inside a reed plugged with petroleum hidden inside a calabash.[7] Willibald and his companions were arrested and their baggage examined, but they were eventually released when the search turned up nothing more than a calabash smelling of petroleum.[8] Had the balsam been discovered, Willibald claims that the punishment for smuggling out such a valuable substance was death. If the story is true, it reveals not only the high price and difficulty of obtaining balsam, but its importance to Willibald: why else would he have risked his life for this substance? While it is not recorded if this balsam was intended for medical, perfuming, or incense purposes (or a combination of these functions), *balsamum*, *opobalsamum*, and *xilobalsamum* are recorded with some frequency in recipes.

Returning to the continent, there are a number of non-medical texts that document the exchange of some of the exotic substances listed in recipes, at least in relatively small quantities among the elite. Epistolary evidence, for example, indicates that Boniface (*c*. 675-754), Archbishop of Mainz, was sent spices and resins as gifts from Roman clergy on three occasions. In one case, Cardinal Deacon Gemmulus sent four ounces of cinnamon, four ounces of costus, two pounds of pepper, and one pound of cozumber (a derivative of storax detailed below).[9] This gift is particularly significant when considering Cynehard's request for *exotica*: he wrote to Lull, Boniface's successor in Mainz. While it is unknown how long this supply would have lasted, perhaps the letter from Cynehard should therefore be seen as a targeted request. Did he know that Mainz had, at least not too long before, acquired these exotic

[7] *Vitae Willibaldi et Wynnebaldi*, ed. O. Holder-Egger, *MGH SS* 15.1 (Hanover, 1887), pp. 80-117; Willibald, *Hodoeporicon*, trans. C. H. Talbot, *The Anglo-Saxon Missionaries in Germany* (London, 1954), p. 170. On Huneberc, see B. Bischoff, 'Wer ist die Nonne von Heidenheim?' *Studien un Mitteilungen zur Geschichte des Benediktinerordens* 49 (1931), 387-97; E. P. M. Dronke, *Women Writers of the Middle Ages* (Cambridge, 1984), pp. 1-35.
[8] Willibald, Hodoeporicon, trans. C. H. Talbot, The Anglo-Saxon Missionaries in Germany, p. 170.
[9] Gemmulus, Epistula 62, MGH Epistolae selectae I, pp. 127-8.

products? Even if Boniface's gifts were no longer present, it is possible that news of the (past) existence of these substances in Mainz had spread.

A letter in the *Collectio sangallensis* from the second half of the ninth century suggests that access to these types of non-local substances increased in the years following Gemmulus' gifts to Boniface. In this case, the letter records that a bishop, probably Salomon II of Constance, sent Louis the German exotic goods, including fine textiles, an ivory comb, and exotic fruits and spices, in an attempt to appease him.[10] Although there is no reference to medicine, many of the fruits, spices, gums, and resins listed in the letter, such as dates, figs, pomegranates, cinnamon, galangal, cloves, mastic, and pepper, appear as ingredients in medical recipes. While this text only documents the exchange of *exotica* among the most privileged members of Carolingian society, it does suggest that ecclesiastical and aristocratic elites had access to a wider range of foreign products by the middle of the ninth century: Salomon sent a much more diverse collection of exotics than did Gemmulus.

Although these records do not directly link trade in exotics and elite gift-giving to medical uses, there are hints of this connection, such as the annual purchase of honey and spices, *pigmenta*, for the treatment of sick monks recorded in the *Gesta* of the Abbey of Fontenelle. The abbot Ansegius (*c*. 770-*c*. 833) allocated a pound of silver per year for this purpose.[11] The use of the term *pigmenta* is somewhat ambiguous, as the word could refer to a range of products including paints, pigments, and their composite parts as well as spices and medicaments.[12] In this case, it makes sense to read *pigmenta* as spices given the explicit link with medical practice (though medical

[10] Collectio Sangallensis, ed. K. Zeumer, MGH Form., (Hanover, 1886), 29, 415.15-19: Palliolum coloris prasini et aliud polimitum, spatulas palmarum cum suis fructibus, cynamomi, calangani, cariofili, masticis et piperis fasciculum, caricas ficorum, malogranata, pectinem elefantium, vermiculos, cicadas, aves psitacos, merulam albam et longissimam spinam de pisce marino; McCormick, Origins of the European Economy, p. 710.
[11] Chronique des Abbés de Fontenelle (Saint-Wandrille), ed. and trans. P. Pradié (Paris, 1999), XIII, 8, p. 188: Ad infirmorum curam mel et pigmenta libram I. See also McCormick, Origins of the European Economy, p. 709.
[12] J. F. Niermeyer, *Mediae Latinitatis Lexicon Minus*, 2nd edn (Leiden, 1984), p. 796.

recipes do share many ingredients in common with paints and pigments).[13] It remains unclear, however, which particular products the abbot intended to buy, though it is likely they were foreign imports.

Before considering exotics in recipes, it is important to reflect on what these records tell us about the potential availability of non-local substances, and especially those that are listed as ingredients, in the Carolingian world. First, with few additional sources documenting the movement and purchase of these types of substances, it is evident that, overall, access to such products, whether acquired through trade, gift-exchange, or even illicit means, would have been extremely limited.[14] The handful of references reviewed above do, however, indicate that at least a number of the many non-local ingredients listed in recipes did make appearances in the Frankish Empire during this period. This topic can be probed further, and it is important to bear in mind how long supplies of these exotics may have lasted. The texts reveal that exotic products did not move in large quantities: consider the ounces and pounds recorded in the letter to Boniface. If this did provide sufficient quantities of *exotica* for the beneficiaries' purposes, how long would these substances have remained in a good condition? The record of gift-giving among elites involving exotics suggests only sporadic trade in these items, rather than a constant supply, making questions of long-term storage essential. On the other hand, the annual supply of *pigmenta* documented by the *Gesta* of the Abbey of Fontenelle at least points to more regular trade in spices and long-term planning, reflecting that certain ingredients may have been stored for extended periods of time. Finally, these records only speak to the availability of exotics

[13] For more on ink and paint production, see D. Cardon, *Natural Dyes: Sources, Tradition, Technology and Science* (London, 2007) and, for the early medieval context, McKitterick, *The Carolingians and the Written Word*, pp. 241-6.

[14] The depiction of Harun al-Rashid's gifts to Charlemagne (first described by the Royal Frankish Annals in the entries for the years 802 and 807 and then later mentioned by Notker the Stammerer) provides one further example of gift-exchange involving *exotica*. *Annales regni Francorum inde ab a. 741 usque ad a. 829 qui dicitur Annales laurissenses maiores et Einhardi*, ed. F. Kurze, *MGH SRG* 6 (Hanover, 1895). For year 802, see p. 117; year 807, pp. 122-5. Notker, *Gesta Karoli*, ed. R. Rau, *Quellen zur Karolingischen Reichsgeschichte*, 3 vols (Darmstadt, 1974) II, pp. 388-90.

among elites and ecclesiastical communities; though the biases of the textual sources may skew our understanding of the full spectrum of society, it is unlikely that such products circulated widely in lower strata. Following this review of evidence for the general movement and potential availability of exotic substances, it is possible to examine the appearance of non-local ingredients in recipe collections.

Exotic ingredients in medical recipes

It is helpful to first consider what constitutes an 'exotic' ingredient as defining 'non-local' is problematic for a number of reasons. Given the size of the Frankish Empire, the variety of (micro-)climates within its borders, and its influence into neighbouring regions, where does 'local' end and 'exotic' begin?[15] A monk in St Gall would have had relatively easy access to alpine plants but perhaps encountered difficulties in procuring Mediterranean products, whereas an aristocratic household in Septimania might have experienced the opposite situation. Would products from the eastern Mediterranean be considered exotic beyond the Alps but more readily available in Rome, Ravenna, and sites that maintained a greater level of contact with the Byzantine world? The many products from even further afield, such as the gums, resins, and spices of the Middle East, East Africa, and Southeast Asia, would have required transport over immense distances, probably involving many exchanges and much expense. Since the foreignness of these types of ingredients is less ambiguous than that of 'semi-exotic' ingredients (such as those from the eastern Mediterranean), they present a clearer subset of products to investigate, and I shall therefore highlight a cluster of unquestionably exotic ingredients (Sections 2-5) after reviewing questions of terminology (Section 1).

[15] In the insular context, Linda Ehrsam Voigts has also considered the potential impact of past climatic conditions on the cultivation of medicinal plants, another important dimension to take into account when investigating this topic. Voigts, 'Anglo-Saxon Plant Remedies and the Anglo-Saxons', 261-3. On the question of exoticness of ingredients in recipes, see also Pilsworth, *Healthcare in Early Medieval Northern Italy*, p. 80.

1. TERMINOLOGY

The challenge of terminology must be addressed as the identities of many ingredients continue to be debated.[16] Take the term *amomum*: while some scholars have translated this as 'Nepal cardamom', others have considered it to be a synonym for 'poppy'.[17] Although this difference in interpretation is particularly large, others are more straightforward, such as the mistaken use of 'galingale' versus 'galangal'. English translators have often used the former when describing both *cyperus* and *galangal* (and their orthographic variants), though these represent entirely unrelated plants: galingale should be used to describe certain types of sedges (*cyperus*), whereas galangal refers to a tropical plant in the ginger family (*galangal*). This modern terminology mix-up has caused some confusion regarding the initial appearance of galangal in the Latin west.[18]

The case of *azarum-asarum* represents a similar misunderstanding, though one based on contemporary readers confusing alternative medieval spellings. Michael McCormick, for example, notes that a resin, *azarum*, was introduced to western Europe during the Carolingian period.[19] I suggest, however, that *azarum* represents an alternative spelling of *asarum*, hazelwort, a plant native to Europe and known in antiquity. This seems to make more sense in the contexts in which this term is found, at least based on the manuscript sample analysed in this dissertation: in recipes containing *azarum*, the other ingredients are all locally available products (including

[16] Green, 'Bodies, Gender, Health, Disease', p. 3.
[17] Nicholas Everett, for example, translates *amomum* as 'Nepal cardamom' while Monica Green uses 'poppy'. N. Everett, *The Alphabet of Galen: Pharmacy from Antiquity to the Middle Ages*, ed. and trans. N. Everett (Toronto, 2012), pp. 164-5; M. H. Green, *The Trotula: A Medieval Compendium of Women's Medicine*, ed. and trans. M. H. Green (Philadelphia, 2001), p. 157. Petros Bouras-Vallianatos confirmed the ongoing debate/uncertainty regarding identity of *amomum* in his plenary lecture at the 2019 conference, 'Medicine and Trade in the Classical World' (Cambridge, 10 September 2019).
[18] Carlo Battisti, for example, argues that galangal was introduced to western Europe in the thirteenth century, though instances of *galangal* in earlier manuscripts certainly suggest otherwise. C. Battisti, 'Repercussioni lessicali del commercio orientale nel periodo giustinianeo', in *Moneta e scambi nell'alto medioevo: VIII settimana di studio, 21-27 aprile 1960* (Spoleto, 1961), 627-82, p. 639.
[19] McCormick, Origins of the European Economy, p. 714.

beer, a substance highlighted in Chapter 3 in relation to adaptations made to suit local conditions).[20] Furthermore, in the recipe *Ad flegma curandum*, the juice of the ingredient in question (*azari sucum*) is recommended, strengthening an identification with hazelwort rather than a resin.[21] When medieval synonyms or local names are also added to this already complicated picture, there is great potential for misinterpretation and debate—among Carolingian scribes *and* researchers today.

Geographic labels present an additional complication when interpreting the foreignness of ingredients. Attic honey (*melle attico*), African snails (*cocleas africanas*), and Illyrian irises (*iris illyrica*), for example, each link a product to a particular location, but do they really indicate their source? In many cases, such as *fenugrecum*, *reopontico*, or *mala punica* (terms for fenugreek, rhubarb, and pomegranates, respectively), the geographic element of the product's name appears to have become integrated into the name itself. It is useful to consider modern parallels: French fries are not inherently French, nor are Belgian waffles necessarily Belgian, though these geographic labels have become inseparable from the products themselves. While the same cannot be assumed for ingredients listed in eighth- and ninth-century manuscripts, this possibility should not be dismissed.

2. Camphor and ambergris: A starting point

Based on the points laid out in Section 1, I investigated a number of exotic ingredients unknown in classical and late antique medical writings, using Riddle's aforementioned study and McCormick's identifications as an entry point into this topic. In the first MMC of csg. 44 (pp. 228-55), Riddle highlights two new products: camphor, an aromatic extract from the wood of the camphor laurel, and ambergris, a pungent substance produced in the digestive tract of sperm whales.[22] McCormick also notes the appearance of camphor and ambergris in csg. 44 (and mentions examples of the former in the *Lorscher Arzneibuch*, a section of csg. 217 not analysed in this

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[20] Csg. 44, pp. 345, 351-3 (five examples).
[21] Ibid, p. 351.
[22] Riddle, 'The Introduction and Use of Eastern Drugs in the Early Middle Ages', pp. 190-1.

dissertation, and the ninth- or tenth-century Glasgow Hunterian MS T.4.13) in addition to his comment on the introduction of *azarum*.[23] Both Riddle and McCormick argue that the appearance of camphor and ambergris in the written record reflects the introduction of these products into the Latin west.[24] While it is impossible to prove this without further evidence, such as archaeological finds or additional textual sources (like the record of gift exchanges noted above) that confirm the importation of these substances, the linked movement of knowledge and goods will be reconsidered below. If camphor and ambergris were available in the Carolingian period (though only as rare, expensive products in limited quantities), they present a useful case study for assessing practicality. Are they found in additional recipes? Is there evidence to suggest that knowledge of these products spread within the Frankish Empire?

3. The *Confectio timiame*: Camphor, ambergris, and other *exotica*

Despite highlighting the newness of camphor and ambergris and their appearance in the same manuscript, csg. 44, neither Riddle nor McCormick point out that these two products appear in the *same* recipe in this manuscript, the *Confectio timiame*, a recipe for incense (see Figure 4.1).

Confectio timiame:

Cozumbrio liber i storace ~ ii et drachma ii confiti ~
iii et drachma vi thus ~ i drachma ii mirra drachma
vi mastice ~ i spica ~ i et drachma vi croco drachma

[23] McCormick, *Origins of the European Economy*, p. 714, nn. 83-4. For the manuscripts in question, see Bamberg, Staatsbibliothek, Msc. Med. 1 and Glasgow, Hunterian Collection, MS T.4.13.

[24] McCormick, *Origins of the European Economy*, pp. 714-15; Riddle, 'The Introduction and Use of Eastern Drugs in the Early Middle Ages', pp. 190-6; Z. Amar and E. Lev, *Arabian Drugs in Early Medieval Mediterranean Medicine* (Edinburgh, 2017), see especially Chapter 3, ''Arabian' Substances', pp. 129-227 (camphor is discussed in detail on pp. 144-8, and ambergris on pp. 148-52).

ii aloa ~ i et drachma vi cafora ~ i et drachma i musco drachma iiii ambar drachma i.[25]

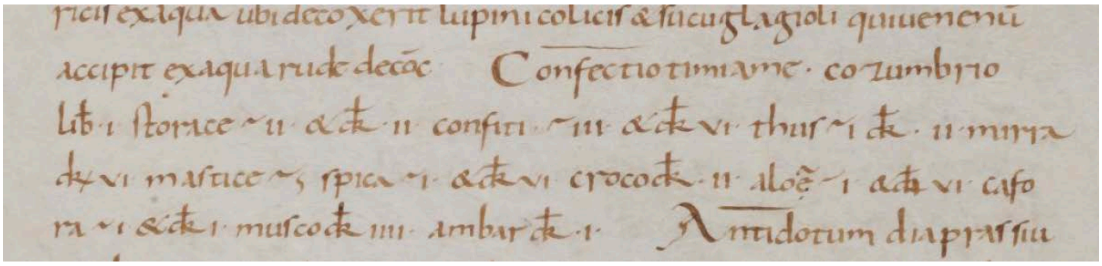

***Figure 4.1**:* Confectio timiame *(csg. 44, p. 247)*

Although this recipe does not include a list of ailments it intends to treat, its appearance within an MMC and use of many ingredients that are frequently listed in remedies suggest that it could have been intended for use in a medical context. Moreover, its lack of description is not unlike the recipes of many composite ingredients, such as oxymel (a mixture of vinegar, honey, and sometimes additional components) or mixed oils (rose oil (*oleo roseo*), cedar oil (*oleo cedrinum*), myrtle oil (*oleo mirtino*), and so on), that required advanced preparation before their use in recipes. Confirming the possibility that incense could be used in medical recipes (in addition to its religious functions), both *incensum* and *thymiama* are listed as ingredients in recipes, such as *Ad litargigum* of csg. 44 and *Ad cadiuo homine* of BAV reg. lat. 1143.[26] By accepting the multipurpose nature of incense, it is appropriate to include this recipe in the present study.[27] A review of its twelve ingredients, cozumber (*cozumbrio*), storax (*storace*), *confita* (*confiti*), frankincense (*thus*), myrrh (*mirra*), mastic (*mastice*), spikenard (*spica*), saffron (*croco*), aloe (*aloa*), camphor (*cafora*),

[25] Csg. 44, p. 247: Confectio timiame . cozumbrio liber . i . storace ~ ii . et drachma . ii . confiti . ~ iii . et drachma vi . thus ~ i drachma . ii mirra drachma vi mastice ~ s spica ~ i et drachma vi croco drachma . ii . alo[e]\a/ ~ i et drachma . vi . cafora ~ i et drachma i . musco drachma iiii . ambar drachma . i; for a review of the weights and measures used in early medieval recipes, such as liber and drachma, see H. E. Sigerist, 'Maße und Gewichte in den medizinischen Texten des frühen Mittelalters', Kyklos 3 (1930), 439-44 and B. Bischoff, Anecdota novissima. Texte des vierten bis sechsenhnten Jahrhunderts (Stuttgart, 1984), pp. 169-70 ('Maße und Gewichte zur Zeit Papst Hadrians I. (772-795)').
[26] Csg. 44, p. 326; BAV reg. lat. 1143, f. 109^{r}.
[27] For more on this topic, see Burridge, 'Incense in Medicine'.

musk (*musco*), and ambergris (*ambar*), reveals the recipe's total reliance on exotics: not a single ingredient is native to northern and/or western Europe. Most of the ingredients are aromatic gums and resins, although ambergris and musk stand out as animal-based substances.

While Riddle and McCormick emphasised the newness of only ambergris and camphor, the appearance of three other ingredients in this incense recipe, cozumber, *confita*, and musk, is similarly noteworthy. McCormick does make a passing reference to cozumber but provides no further details beyond classifying it as an 'exotic substance' and noting that its 'derivation…is unclear'; *confita*, on the other hand, is mentioned by neither author.[28] According to Carmélia Opsomer's *Index de la pharmacopée du I^er au X^e siècle*, these ingredients do not occur in classical sources, though both terms are listed in later medical texts, such as the thirteenth-century medico-botanical glossary *Alphita*.[29] According to this text, the two substances are related to each other (*cozimbrum* is described as '*fex confite*') and represent derivatives of storax.[30] This identification fits within the context of an incense recipe. Excepting medical contexts, I have seen cozumber mentioned in only two other contemporary sources: a) the aforementioned letter to Boniface recorded cozumber as one of the gifts, and b) it is included in a list of goods to buy in the market in the *Polyptych of Irminon* from the early ninth century.[31] The lack of cozumber and *confita* in classical texts, their appearance in early medieval recipes, and continued presence in later writings strongly suggests that these two products, at least in these specific forms, first arrived in western Europe in the eighth century. Perhaps most importantly, the fact

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[28] McCormick, Origins of the European Economy, p. 708.

[29] *Cozimbrium* is recorded six times in *Index de la pharmacopée du Ier au Xe siècle* (see Opsomer, *Index de la pharmacopée du Ier au Xe siècle*, I, p. 222) in non-classical texts, while there is no entry for *confita*. However, a fairly similar term, *gomphita*, is recorded four times (p. 324).

[30] *Alphita*, ed. and trans. A. García González (Florence, 2007); *confita* is discussed on pp. 400-1 and *cozimbrum* on p. 403.

[31] Gemmulus, Epistula 62, MGH Epistolae selectae I, pp. 127-8; B. Guérard, Polyptyque de l'abbé Irminon de Saint-Germain-des-Prés, ou dénombrement des manses, des serfs et des revenus de l'abbaye de Saint-Germain-des-Prés sous le règnede Charlemagne, 2 vols (Paris, 1844), II, p. 336.

that two non-medical texts mention cozumber indicates that, at least in the case of one of the newly recorded ingredients I have identified, the product itself was present in western Europe. While this only confirms the argument put forward by Riddle and McCormick with respect to one ingredient, it adds weight to the idea that both the substances themselves *and* information about them arrived in the Frankish world during this period.

Musk, on the other hand, has a more complicated early history. In the Latin west, the first attestation of this substance (a secretion of the musk deer) occurs in Jerome's (d. 419) *Adversus Iovinianum*.[32] However, musk does not reappear in the written record for at least a century and only then is mentioned by Greek sources, such as Paul of Aegina (fl. seventh century).[33] The next Latin references to musk come from Carolingian medical texts, suggesting that it was reintroduced to western Europe during this period. Most significantly from a medical perspective, musk appears in neither classical nor late antique Latin medical writings, revealing that even if musk had been known in earlier periods, it was not recorded in relation to medicine.[34]

The existence within a single recipe of a cluster of five newly introduced (or reintroduced) ingredients from the far east is particularly striking. The recipe's exclusive reliance on foreign, imported substances adds to its overall exoticness. These features, though especially the grouping of new products, suggest that the scribe who compiled the MMC in which the *Confectio timiame* is located used a variety of sources (or that the exemplar copied by this scribe was based on multiple sources), including material outside the classical canon. The inclusion of this recipe thus indicates that at least one site of manuscript production had access to non-classical medical information *and* was open to incorporating it. Given that Riddle and McCormick's studies were based on a very limited sample of the few published transcriptions of recipe collections

[32] A. H. King, *Scent from the Garden of Paradise: Musk and the Medieval Islamic World* (Leiden, 2017); Amar and Lev, *Arabian Drugs*, again, see Chapter 3, ''Arabian' Substances', pp. 129-227 (musk is discussed on pp. 157-62).
[33] King, *Scent from the Garden of Paradise*, see especially pp. 133-6 for late antique references to musk.
[34] Amar and Lev, *Arabian Drugs*, pp. 157-62.

from the Carolingian period, their work only scratched the surface—McCormick notes, 'I have not had the leisure to undertake the exhaustive philological and historical study these treatises – and their MSS – deserve: they may still hold some surprises'.[35] With that in mind, the rest of the 4335 recipes I transcribed must be investigated.

4. The recurrent cluster: Parallels among incense recipes

Within the manuscript sample involved in this dissertation, I uncovered three further examples of recipes that include the cluster of ingredients discussed above (ambergris, camphor, *confita*, cozumber, and musk). One is found in csg. 761 (see Figure 4.2) and two are located in csg. 878 (see Figure 4.3).[36] As shown in Figure 4.4, an additional recipe in csg. 752 lists four of the five ingredients of this ingredient group (ambergris was not included).[37] Table 4.1 presents the five recipes that contain this notable cluster of newly introduced products (including both the original recipe in csg. 44 and the recipe from csg. 752 lacking ambergris).

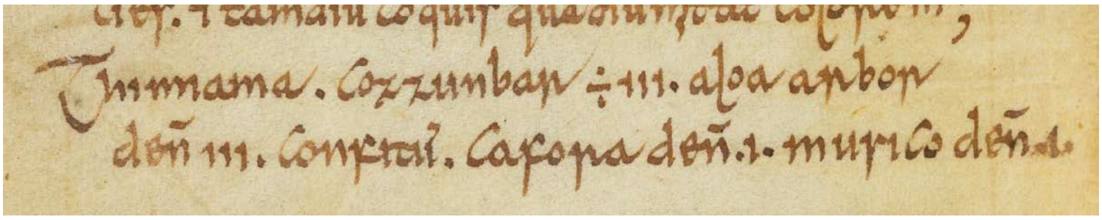


***Figure 4.2**:* Thimiama *(csg. 761, p. 66)*

[35] McCormick, *Origins of the European Economy*, p. 714, n. 84; The transcriptions completed by Sigerist and Jörimann in the early twentieth century remain the only published material available in this area (see Chapter 2); Sigerist, *Studien und Texte* and Jörimann, *Frühmittelalterliche Rezeptarien*.
[36] Csg. 761, p. 66; csg. 878, p. 334.
[37] Csg. 752, p. 82.

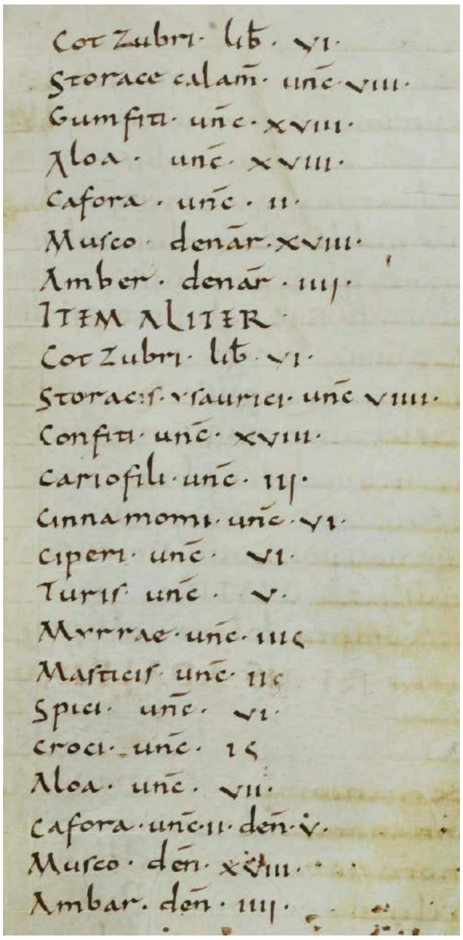
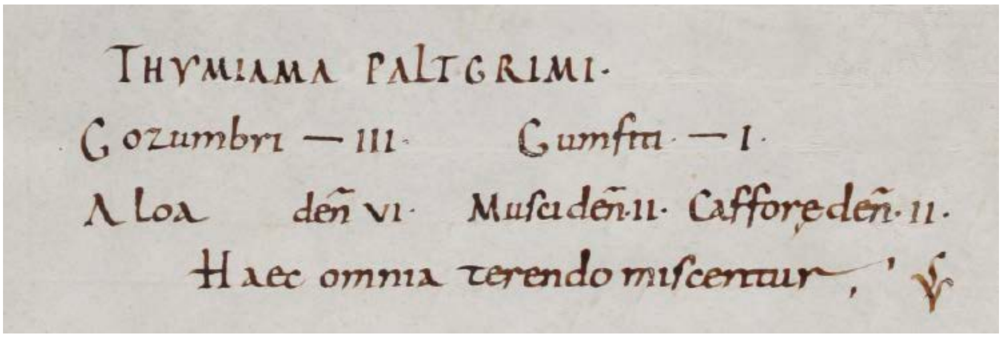

Cot zubri · lib · vi ·
Storace calam · unc · viii ·
Gumfita · unc · xviii ·
Aloa · unc · xviii ·
Cafora · unc · ii ·
Musco · denar · xviii ·
Amber · denar · iiii ·
ITEM ALITER ·
Cot zubri · lib · vi ·
Storacis · v · sauricii · unc viii ·
Confita · unc · xviii ·
Cariofili · unc · iii ·
Cinnamomi · unc · vi ·
Ciperi · unc · vi ·
Turis · unc · v ·
Myrrae · unc · iiis
Masticis · unc · iis
Spica · unc · vi ·
Croci · unc · is
Aloa · unc · vii ·
Cafora · unc · ii · den · v ·
Musco · den · xviii ·
Ambar · den · iiii ·

Figure 4.3: *Incense recipes in csg. 878 (p. 334)*

In addition to the *Confectio timiame* of csg. 44, the titles of the recipes in csg. 752 and 761, *Thymiama paltgrimi* and *Thimiama*, respectively, indicate that these, too, are preparations for incense. The two recipes in csg. 878, representing the only material written on p. 334 (see Figure 4.3), lack such an obvious reference to incense. The top recipe, labelled csg. 878a in the tables, is missing a title, while the lower recipe, csg. 878b, is listed as *Item aliter*. However, given their parallels with the other recipes and the absence of this particular combination of ingredients in other contexts, it can be assumed that these recipes also concern incense. Despite the variety of ingredients, all recipes contain a core group of five ingredients, almost perfectly paralleling the five newly recorded ingredients (though missing ambergris); the five constants are camphor, *confita*, cozumber, musk, and aloeswood. Four of the five recipes, however, contain all of the five newly introduced ingredients (as well as aloeswood). Given that csg. 878 recorded two versions of the recipe, it appears that two variants may have been in circulation. The recipes of csg. 752 and 761 fit with the simpler csg. 878a, whereas the inclusion of frankincense, myrrh, mastic, spikenard, and saffron in csg. 44 aligns with the more complex csg. 878b (see Table 4.1). The recurrence of recipes showing such a high degree of overlap strongly suggests that an eastern incense recipe tradition arrived in a western site of manuscript production in the late eighth or early ninth centuries. (Or, given the variation between each recipe, perhaps multiple related traditions were introduced to several centres with eastern trade links.)



Thymiama paltgrimi·
Cozumbri — III· Cumfita — I·
Aloa den̄ VI· Muscaden̄ II· Cafforeden̄ II·
Haec omnia terendo miscentur

Figure 4.4: Thymiama paltgrimi *(csg. 752, p. 82)*

Table 4.1
Incense recipes containing the ingredient cluster
(Note: the order of the ingredients in each recipe has been rearranged to illustrate their parallels more clearly)

Ms	Csg. 878b	Csg. 44	Csg. 878a	Csg. 761	Csg. 752
Recipe title	*Item aliter*	*Confectio timiame*	*[untitled]*	*Thimiama*	*Thymiama paltgrimi*
Ingredients	cozumber	cozumber	cozumber	cozumber	cozumber
	confita	*confita*	*confita*	*confita*	*confita*
	aloeswood	aloeswood	aloeswood	aloeswood	aloeswood
	camphor	camphor	camphor	camphor	camphor
	musk	musk	musk	musk	musk
	ambergris	ambergris	ambergris	ambergris	
	storax	storax	storax		
	frankincense	frankincense			
	myrrh	myrrh			
	mastic	mastic			
	spikenard	spikenard			
	saffron	saffron			
	cloves				
	cinnamon				
	galangal				

It is essential to consider the environments in which these manuscripts were produced in order to investigate possible paths for the dissemination of this knowledge.

Csg. 761 and csg. 878 represent the earliest of the four manuscripts that contain this distinctive cluster of ingredients, with Bischoff dating both to the first half of the ninth century. Regarding csg. 878, Walahfrid Strabo's *vademecum*, Bischoff has identified the hand on p. 334 as Walahfrid's own and has categorised it as belonging to his penultimate script phase, thereby dating it to the second quarter of the ninth century.[38] In contrast, csg. 44 was composed in the second half of the ninth century and csg. 752 has been dated to the very end of the century, *c*. 900.[39] Csg. 752, 761, and 878 were written at centres north of the Alps (St Gall, Fulda, and Reichenau, respectively), whereas the medical half of csg. 44 was produced in northern Italy and then moved to St Gall shortly after its composition.[40] Despite being one of the later manuscripts in this group, the movement of csg. 44 illustrates a possible route for the transmission of this recipe and parallels the known movement of cozumber based on the gifts sent to Boniface. With this in mind, I suggest that the new incense tradition may have been first included in medical texts in the Italian peninsula. Links between scriptoria in northern Italy and monastic centres in present-day Switzerland and Germany, such as St Gall, Reichenau, and Fulda, then resulted in the dissemination of this recipe. Indeed, Florence Eliza Glaze has drawn attention to the movement of manuscripts with medical texts between several monastic centres in this region, including Reichenau, St Gall, and Murbach, though the codices in which the recipes are located were not addressed.[41]

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[38] Bischoff, *Katalog der festländischen Handschriften*, III, p. 333; B. Bischoff, 'Eine Sammelhandschrift Walahfrid Strabos (Cod. Sangall. 878)', *Mittelalterliche Studien, Ausgewählte Aufsätze zur Schriftkunde und Literaturgeschichte*, 3 vols (Stuttgart, 1966-81), II, pp. 34-51.
[39] Bischoff, *Katalog der festländischen Handschriften*, III, pp. 301 and 332; B. Bischoff, 'Italienische Handschriften des neunten bis elften Jahrhunderts in frühmittelalterlichen Bibliotheken ausserhalb Italiens', in C. Questa and R. Raffaelli (eds), *Il libro e il testo: atti del Convegno Internazionale, Urbino, 20-23 Settembre 1982* (Urbino, 1984), 169-94.
[40] Bischoff, *Katalog der festländischen Handschriften*, III, pp. 301, 332-3; Bischoff, 'Eine Sammelhandschrift Walahfrid Strabos (Cod. Sangall. 878)', pp. 34-51; B. Bischoff, 'Italienische Handschriften des neunten bis elften Jahrhunderts in frühmittelalterlichen Bibliotheken ausserhalb Italiens', pp. 177-8.
[41] Glaze, 'The perforated wall', pp. 73-5, 92-8; J. J. Contreni, 'Masters and Medicine in Northern France in the Reign of Charles the Bald',j in M. Gibson and J. Nelson (eds),

It is also important to consider whether alternative incense recipes circulated in the Carolingian period and, if so, whether they relied on more local ingredients or exotics known from classical sources. An analysis of the manuscript sample uncovered two additional incense recipes, the *Conpositio thymamatis* and *Tymiama simplex*, both located in csg. 759 (see Figures 4.5 and 4.6).[42] An index in Paris BnF lat. 6882A records nearly identical titles, *Conpositio timiamatis* and *Timiama simplex*, though the recipes themselves have not survived.[43] A comparison of the indices in csg. 759 and Paris BnF lat. 6882A reveals that these manuscripts contained related MMCs, perhaps deriving from the same exemplar, and therefore suggests that these lost recipes would have presented the same (or at least a very similar) incense tradition.[44]

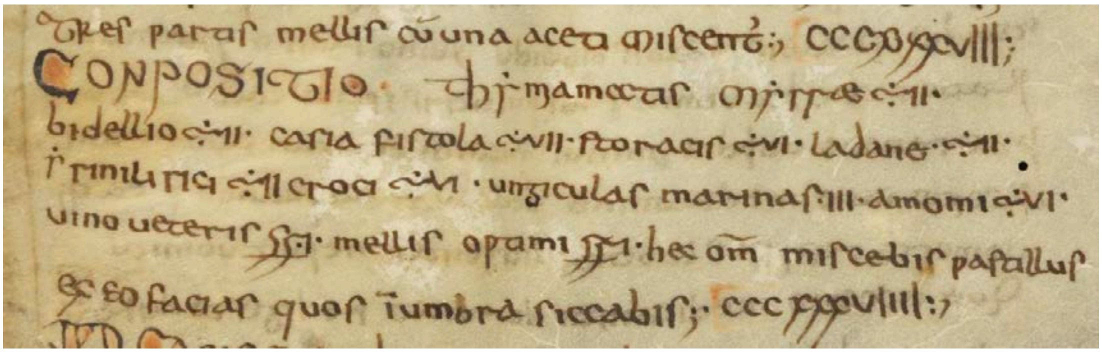

***Figure 4.5**:* Conpositio thymamatis *(csg. 759, p. 89)*

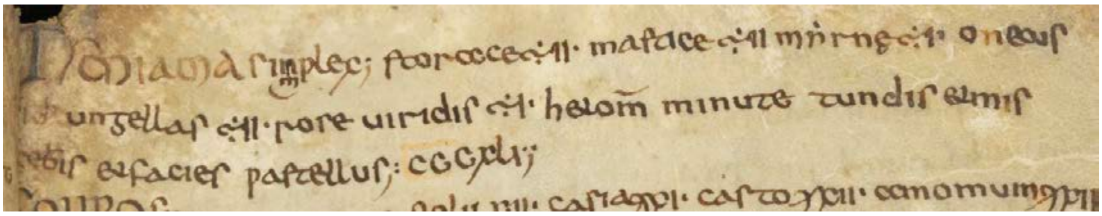

***Figure 4.6**:* Tymiama simplex *(csg. 759, p. 91)*

As seen in Table 4.2, the *Conpositio thymamatis* and *Tymiama simplex* share only three ingredients between them and contain none of the core ingredients of the incense recipes reviewed above. They do, however, share some ingredients with the

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Charles the Bald: Court and Kingdom. Papers based on a Colloquium held in London in April 1979, 2nd edn (Aldershot, 1990), 267-82.

[42] Csg. 759, pp. 89 and 91.

[43] Paris BnF lat. 6882A, f. 7r.

[44] Csg. 759, pp. 53-8; Paris BnF lat. 6882A, ff. 1v-8v.

longer incense recipes, such as myrrh (csg. 44 and 878b), storax (csg. 44, 878a and b), and cinnamon (csg. 878b), and generally rely on similar substances, namely exotic gums, resins, and spices. The difference in ingredients suggests that the recipes in csg. 759 do not share the same source as the recipes containing newly introduced exotics, though it is interesting to note that, like the complex-simple division of recipes noted above, the recipes in csg. 759 and Paris BnF lat. 6882A are similarly (and explicitly) distinguished.

Table 4.2
Ingredients in incense recipes from csg. 759

Ms	Csg. 759 (p. 89)	Csg. 759 (p. 91)
Recipe title	*Conpositio thymamatis*	*Tymiama simplex*
Ingredients	myrrh	myrrh
	storax	storax
	unguiculas	*ungellas*
	bdellium	
	cinnamon	
	ladanum	
	iris	
	saffron	
	nepal cardamom	
	wine	
	honey	
		mastic
		rose

Two points must be made about how the second cluster of incense recipes differs from the first. Bischoff suggested that csg. 759 was written in Brittany and Paris BnF lat. 6882A was composed in southwest France, dating both to the first half of the ninth century.[45] These origins place the manuscripts outside the northern Italian-transalpine network noted above and suggest that, at least in the early ninth century,

[45] Bischoff, Katalog der festländischen Handschriften, III, pp. 119 and 332.

these centres might not have had the same degree of access to texts incorporating knowledge of these substances (or to the newly imported *exotica* themselves). Secondly, the incense tradition seen in csg. 759 appears to have more in common with biblical recipes for incense. Exodus XXX.34, for example, writes: 'And the Lord said to Moses: Take unto thee spices, stacte, and onycha, galbanum of sweet savour, and the clearest frankincense, all shall be of equal weight'.[46] Although the recipes in csg. 759 record neither galbanum nor frankincense, both list spices, myrrh (stacte), and possibly onycha, paralleling the biblical incense recipe.[47] Although these ingredients are exotic, they were known in the classical world, suggesting that csg. 759 (and by extension Paris BnF lat. 6882A) may have recorded an established incense tradition.[48] In contrast, csg. 44, 752, 761, and 878 present a recipe tradition incorporating newly introduced information, perhaps reflecting that the sites at which they were produced were more closely connected to the exchange of knowledge (and substances) from the east.

Having now explored the appearance of this cluster of exotic products in incense recipes and considered a possible route for the dissemination of the recipe tradition that included these particular exotics, the addition of these newly introduced ingredients to remedies *independent of* incense recipes must be investigated. Were any (or all) of these five ingredients also incorporated into the wider medical literature or did they remain exclusively associated with incense?

5. The spread of knowledge: Moving beyond incense recipes

Analysis of the manuscript sample involved in this dissertation revealed additional instances of each of the five newly introduced ingredients, ambergris,

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[46] Exodus XXX.34: *dixitque Dominus ad Mosen sume tibi aromata stacten et onycha galbanen boni odoris et tus lucidissimum aequalis ponderis erunt omnia*.

[47] The terms *unguiculas* and *ungellas* may be linked with onycha, but the interpretation of all three words is debated; for more on this debate, see H. J. Abrahams, 'Onycha, Ingredient of the Ancient Jewish Incense: An Attempt at Identification', *Economic Botany* 33 (1979), 233-6.

[48] Amar and Lev, *Arabian Drugs*, pp. 129-227.

camphor, *confita*, cozumber, and musk. This chapter's opening recipe, in fact, provides one such example: the *Antidotum gira deacoloquintidis* of BAV pal. lat. 1088 lists camphor, *cafora*, among its twenty-eight ingredients. The appearance of these products, however, is very limited. Aside from the five incense recipes, the 4335-recipe sample includes only a single reference to ambergris, two to camphor (including the aforementioned *Antidotum gira deacoloquintidis*), two to *confita*, three to cozumber, and three to musk. These eleven references represent only nine recipes since two recipes, both in csg. 44, include two newly introduced ingredients: the *Confectio saponi constantini* lists both *confita* and musk while the second recipe under the entry titled *Potio maniacis siue gutta catiua* contains *confita* and cozumber.[49] Table 4.3 presents the distribution of these references within the manuscript sample: csg. 44 and BAV pal. lat. 1088 both contain four examples of newly recorded exotics (though in both manuscripts two ingredients are repeated, meaning only three *different* substances within the cluster are found in these manuscripts), while csg. 751, BAV lat. 5951, and BAV reg. lat. 1143 each include one example.[50] Musk and cozumber appear most frequently and exhibit the widest spread among manuscripts, each occurring three times in three separate manuscripts. Significantly, only one of these manuscripts, csg. 44, contained an incense recipe and this is the only manuscript to record recipes that use multiple newly introduced ingredients in a single preparation. It must also be noted that two recipes, the *Potio muscata ad omne infirmum* of BAV lat. 5951 and the *Medicamentum ad maculas oculorum et ad caliginem* of BAV pal. lat. 1088 have been inserted in the margins.[51] While the scripts appear to be roughly contemporary with the Carolingian hands seen in each manuscript, it is possible that these represent slightly later additions.

[49] Csg. 44, pp. 282 and 285.
[50] Note: manuscripts in the sample that do not contain any examples of these newly introduced ingredients have not been listed in the table.
[51] BAV lat. 5951, f. 1^{r}; BAV pal. lat. 1088, f. 34^{v}.

Table 4.3 Newly introduced exotics outside of incense recipes						
Ingredient	Manuscripts					
	Csg. 44	Csg. 751	BAV lat. 5951	BAV pal. lat. 1088	BAV reg. lat. 1143	Total
Ambergris	-	1	-	-	-	1
Camphor	-	-	-	2	-	2
Confita	2	-	-	-	-	2
Cozumber	1	-	-	1	1	3
Musk	1	-	1	1	-	3
Total	4	1	1	4	1	11

By considering the origins of the five manuscripts, it may be possible to provide additional insights into the development or incorporation of medical knowledge relating to these new ingredients. As noted above, Bischoff suggested that csg. 44 was written in northern Italy in the second half of the ninth century before moving to St Gall shortly after its composition; the same can be said for csg. 751.[52] BAV lat. 5951 appears to be an early ninth-century work and has been located to either Italy or Burgundy while BAV pal. lat. 1088 has been linked to Lyon in the middle or second half of the ninth century.[53] In contrast, Bischoff suggested that BAV reg. lat. 1143 was written in Mainz in the early ninth century.[54] With this context in mind, three features stand out. First, csg. 44 and 751 fit with the pattern seen above. Evidence such as the letter to Boniface indicates that, at least in some cases, these exotic products moved north from the Italian peninsula. These two manuscripts, which together contain recipes listing ambergris, *confita*, cozumber, and musk, followed a similar trajectory, moving from northern Italy to St Gall and helping to disseminate information about these new products.

Secondly, the single instance of one of the newly recorded exotic products in BAV reg. lat. 1143 is particularly intriguing when considered in light of its origins. In

[52] Bischoff, Katalog der festländischen Handschriften, III, p. 332.
[53] Ibid, pp. 418 and 455.
[54] Ibid, p. 438.

this case, the recipe *Ciraturiu artriticus opotatricus a parlasensis*, found on ff. 187^{r}-187^{v}, records cozumber as its thirty-fifth ingredient (out of an astounding list of sixty-four ingredients).[55] This relatively early manuscript was composed in Mainz, the seat of Boniface, who, as noted above, received exotic gifts from Rome—and these gifts included cozumber. While it may be tempting to connect the existence of cozumber at Mainz to its subsequent inclusion in a medical recipe, this is a fairly large leap to make given that the manuscript was composed roughly two or three generations after Boniface's death.

Finally, the possible origins of BAV lat. 5951 and BAV pal. lat. 1088 in Burgundy suggest another direction in which this knowledge and these products travelled. Like csg. 44, BAV pal. lat. 1088 contains four references to the newly introduced products, but in contrast to csg. 44, these represent four separate recipes (csg. 44 only contains two recipes with new ingredients since each recipe lists two of the substances in question).[56] The relatively high number of exotics listed in BAV pal. lat. 1088 combined with its later date support the idea that the number of available exotics, or at least an awareness of them, increased throughout the Carolingian period.

Five of the nine recipes, such as the *Antidotum gira deacoloquintidis* and *Ciraturiu artriticus opotatricus a parlasensis* presented above, list mixtures of previously known exotics, local products, and one of the five new ingredients (though the *Potio maniacis siue gutta catiua* of csg. 44 contains two), while four recipes rely almost exclusively on exotic products, including at least one newly introduced ingredient. Indeed, the titles of two of the particularly exotic recipes, the *Confectio sapone constantini* and the *Potio muscata ad omne infirmum*, both mentioned above, emphasise their foreignness: the former connects to the Byzantine world while the

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[55] BAV reg. lat. 1143, ff. 187^{r}-187^{v}.

[56] As noted above, for both manuscripts, the four references to newly recorded ingredients refer to three separate ingredients (*confita* is mentioned twice in csg. 44 and camphor is recorded twice in BAV pal. lat. 1088).

latter links to the Arabian Peninsula.[57] Similarly, the *Potio ad omnem infirmum* of BAV pal. lat. 1088 incorporates a product directly associated with the Greek east: *blatta bizantea noua ustulata*, freshly roasted Byzantine moths.[58] In addition to musk and moths, the recipe includes frankincense, mastic, coral, small pearls, cinnamon, honey, and old wine.[59] The four preparations that record almost entirely exotic ingredients and contain explicit links with the eastern Mediterranean and Middle East suggest that some foreign recipes, including the examples of incense reviewed above, may have been incorporated into Carolingian medical texts as distinct 'packages' of knowledge. While the process of transmission was probably not direct, it appears that these types of recipes reflect clusters of information from non-local and non-classical sources that were integrated into the corpus of Carolingian medical knowledge as individual units.

On the other hand, the inclusion of a single newly recorded exotic substance in recipes that otherwise contain a fairly standard mix of local and well-known foreign ingredients suggests a different development. In this case, recipes such as the opening example from BAV pal. lat. 1088 or the *Anthidotum ad omnes demoniacos*, also from BAV pal. lat. 1088, appear to add these new products to an existing tradition.[60] These individual, independent insertions of newly introduced ingredients speak to the active adaptation of the medical knowledge in circulation and supports the idea that products and knowledge may have moved together.

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[57] While *muscata* was also the term used for nutmeg, this ingredient does not appear in the recipe, thereby suggesting a connection to the Middle East, and specifically the port of Muscat, though it could also relate to the use of musk, *muscu*, in the recipe.

[58] BAV pal. lat. 1088, f. 51^{v}. At a conference in December 2018, Florence Eliza Glaze commented on the appearance of this term in slightly later Beneventan manuscripts and expressed her uncertainty about this product (F. E. Glaze, 'The Confluence of Latin, Byzantine, and Arabic Pharmacy: Southern Italy c. 1050-1150 CE', a paper given at 'Drugs in the Medieval World (*c*. 1050-*c*. 1400), King's College London, December 7-8, 2018).

[59] BAV pal. lat. 1088, f. 51^{v}: *Potio ad omnem infirmum . Recipit haec musca ~ . i . libanu ~ . i . blatta bizant\e/a . noua ustulata . ~ ii . masticae . ~ . i . corallu . ~ . i . margaritas minutas . \~ viii/ cinamomum . ~ . iii . mel et uinum uetus . quod sufficit.*

[60] BAV pal. lat. 1088, f. 52^{r}.

The practicality of exotic ingredients: Putting the case study in perspective

While I have not found examples of similar material confirming the exchange of the other four newly recorded ingredients, the cozumber example, especially given its frequent links to the other ingredients, suggests that Riddle and McCormick were correct in arguing for the introduction of these products alongside the transfer of knowledge regarding their uses. I would, however, modify their hypothesis in one respect: the scale of the trade in exotic ingredients appears to have been small (low volume, sporadic, and expensive), so we should not assume a direct equivalence between the textual record of these substances and their existence in the Latin west. Instead, I suggest that the recipes that include these exotics provide blueprints for possible treatments *when* these ingredients were available. Their appearance in writing does not reflect their sustained presence, yet the evidence for their trade noted above does speak to the possibility of their availability. The inclusion of these five exotics in medical recipes can therefore be seen as practical information, though several other caveats should also be mentioned.

First, the diffusion of eastern pharmaceutical knowledge, as reflected by the surviving manuscript evidence, does not appear to have been evenly distributed. Similarly, the movement of these substances was uneven, on a small scale, and probably only accessible to elite individuals and/or institutions. Overall, however, it appears that the diversity of exotics in circulation increased over time, at least among the elites, paralleling the rise in references to these ingredients in medical contexts (compare, for example BAV pal. lat. 1088 to BAV lat. 5951). Given that there is some evidence to suggest that the sites of manuscript production that included these ingredients, such as Mainz, were also centres that are known to have had access to the products themselves, it is possible that these recipes may have been written with a knowledge of the ingredients (though perhaps with several intermediaries).

If we accept that both pharmaceutical information about eastern exotics and the *exotica* themselves, keeping in mind the caveats listed above, first arrived (or returned) during this period, it is important to consider the relative timing of their arrival and possible routes of transmission. Regarding the former, the movement of information and goods does create a 'chicken and egg' situation: which arrived first, the products or medical knowledge? Or was it simultaneous? Did the timing of their appearance differ between specific sites? While it remains impossible to establish the precise timing of this exchange, further analysis of the evidence reviewed above may shed some light on these questions. The earliest recorded appearance of cozumber north of the Alps (the mid-eighth-century letter to Boniface) pre-dates its inclusion in medical texts, suggesting that, at least in some cases, the substance arrived before knowledge of its medical uses was recorded. This information, however, may have accompanied the substance, but it has left no trace in the written material.

The incorporation of individual newly recorded substances into otherwise fairly standard recipes (that is, those that include both local and non-local products in contrast to those that rely exclusively on highly exotic ingredients) may reflect a similar pattern—but for different reasons. In these cases, a new ingredient is included alongside familiar substances, such as locally grown herbs and well-known *exotica*, suggesting the indirect influence of eastern pharmaceutical information and the adaptation of the medical traditions that were already circulating in the Latin west. In this case, I suggest that the addition of a new product indicates that the ingredient in question was probably known of (though not necessarily regularly present) and that the compiler(s) of the recipes were directly involved in the process of adapting and revising the existing information, bringing it 'up-to-date' with the latest substances and pharmaceutical knowledge arriving from the east. This could, in fact, suggest some degree of experimentation, though it is impossible to provide clear evidence of such practices.

Given the manuscript evidence and recorded movement of gifts, it appears that Italian centres were instrumental in the transfer of knowledge concerning these *exotica* as well as the substances themselves. The examples of elite gift exchange and use of an Arabic-derived term for ambergris (generally recorded as *anbar* or *ambar* in the Latin manuscripts) point to interactions with Arab trade networks, though this may only help to explain a small piece of the puzzle. I would tentatively suggest that continued connections with the Byzantine world played a significant role in the movement of both goods and knowledge, especially given some of the notably Byzantine ingredients, such as *blatta bizantea*, listed in remedies and the northern Italian origins of a number of the manuscripts containing these types of *exotica*. The Genizah collection also presents evidence for the movement of many exotics around the Mediterranean, meaning Jewish Radhanite traders may have been central to this story, as well.[61]

Ultimately, we have definite evidence for the movement of eastern pharmaceutical knowledge. The incorporation of this information in early medieval Latin recipes, combined with other textual evidence, is suggestive that the ingredients in question may have also arrived during this period—if only sporadically, in limited quantities, and at great expense. I suggest that these developments indicate that the recipes containing these products were intended for use, if only rarely and for an elite market.

Conclusion

This case study presents a glimpse into the world of exotic ingredients. The cluster of newly introduced exotics listed in five incense recipes and its pattern of distribution speaks to the arrival and distribution of this knowledge and the associated ingredients within northwest Europe. Tracing the appearance of each of these ingredients individually supports the general picture exhibited by the incense recipes regarding the process of information diffusion and accords with the evidence provided by non-medical texts.

While this case study points to the practicality of these recipes in specific contexts (namely, *when* the exotic ingredients were available), the same cannot be said for all recipes that record non-local products. Indeed, the case of silphium reflects the very opposite: this plant is thought to have become extinct during antiquity and yet appears in sixteen recipes from the sample studied in this dissertation.[62] Although it is

[61] Amar and Lev, *Arabian Drugs*, pp. 129-227.
[62] K. Parejko, 'Pliny the Elder's Silphium: First Recorded Species Extinction', *Conservation Biology* 17 (2003), 925-7.

possible that the term may have been used to refer to a different, related plant in the early middle ages or that scribes continued to copy it without knowing it had gone extinct (or perhaps with the hope that it might be identified in the future) or that they were simply unsure (and wanted to record it, again, in case of possible future utility), the surviving evidence does not provide additional information. Instead, the inclusion of recipes that rely on substances that would have been impossible to obtain suggests that, in some cases, older authorities may have been copied without a consideration of the possible practicality of the information they contained *or* that they were preserved for other reasons.[63] While the silphium case represents a very small percentage of the total number of recipes (0.04%) and I know of no other extinct plants, it is a useful reminder that, despite some strong evidence for practicality, counter examples complicate the picture.

Finally, the findings presented in this chapter connect to several major debates and questions in the field concerning the conclusions that can be drawn from this body of evidence. First, while some scholars argue that there was considerable movement of exotic goods into continental Europe, others hold a more minimalist view, positing that these goods were not regularly, if ever, available.[64] The implications of my research support a modified minimalist view: while it appears that such *exotica* were not regularly available—and when they were, it was probably only in very small quantities and accessible to select few—there is evidence to support their limited movement. The recipes that include such exotics therefore represent 'latent knowledge', ready to be deployed if/when the ingredients became available. Indeed,

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[63] For example, a number of rough parallels can be found with treatments listed in Marcellus' *De medicamentis liber*. A recipe for *Sales catarticos* in csg. 751 (pp. 418-19) that uses *silfiu* is similar to several preparations in Book 30 of *De medicamentis liber*, including recipes 51 (*Confectio salis cathartici*) and 52 (*Liquamen catharticum*).

[64] McCormick provides a useful overview of the maximalist-minimalist debate in the opening chapter of *Origins of the European Economy*, see pp. 1-24. Caroline Goodson has presented convincing evidence for a more minimalist interpretation (personal communication and 'Ingredients for Medicine in Early Medieval Italy', paper at the Society for the Promotion of Byzantine Studies' 2019 Symposium, *Blood in Byzantium* (1 April 2019)).

the existence of two recipe traditions, one relying on well-known (though still exotic) ingredients and the other incorporating newly recorded substances, indicates that the 'new type' was certainly not the *only* type. Instead of replacing older traditions, the new recipes added more options.

This topic also concerns the question of whether evidence for luxury trade stands in for evidence of trade networks. The types of ingredients analysed in this chapter could have travelled alongside other exotics—and, indeed, the evidence of gift exchange and the records from the Genizah collection indicate that they did in some cases. It would, however, be difficult to build an argument for sustained, large-scale trade networks based on this small sample of luxury substances alone. In other words, while the evidence presented in this chapter (and, more generally, the topic of incense in the Carolingian world) neither confirms nor refutes the possibility that evidence for luxury trade can be used as a proxy for understanding large-scale networks of exchange, it offers a new perspective on this debate.

In short, this chapter has confirmed McCormick's remark that the manuscripts 'may still hold some surprises', highlighting not only how interesting these unattributed recipes are, but also how important it is to study these types of texts in order to build a much more complete understanding of the medical knowledge that circulated in the Carolingian world.[65]

[65] McCormick, Origins of the European Economy, p. 714, n. 84.

Chapter 5

Evidence for Practicality in the Wider Manuscript Context: Units of Measurement, Ingredient Substitutions, and the Process of Composition

Introduction: Additional approaches to investigating the question of practice

Potionem probata ad ilica passio:

> *Agrimonia radices prinde manipulos tres mitte in ulla noua et addis ibidem uinum staupos nouem et coquatur usque ad tertiam partem et bibit quando oporte fuerit radicem de rusco radicem de tribulo radicem de sparago radicem de olisatro radicem appio radicem de petroselino puleio siccum allii capitinas iii semen de malua sicca uncia una porros iiii cum radicinas suas bettonica cum radice sua siue sicca siue uiride radicem de uiola nasturtium ruta siluatica et si non domestica coriandrum anetum oleum quod sufficit.*[1]

The above recipe from BAV reg. lat. 1143, allegedly a tried and tested potion for those suffering from abdominal pains, presents a number of features that speak to its practicality. The most eye-catching of these is the title's bold claim: this potion has been tested, *probata*. Surely such a statement reveals the recipe's application? However, not unlike the case of Terenti(an)us seen in Chapter 1, statements that promote the 'tried and tested' nature of recipes appear relatively frequently, representing a recurrent stock phrase rather than a clear sign of contemporary use. In

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[1] BAV reg. lat. 1143, ff. 185^{r}-185^{v}: Potionem probata ad ilica passio agrimonia radices prinde manipulos tres mitte in ulla noua et addis ibidem uinum staupos nouem et coquatur usque ad tertiam partem et bibit quando oporte fuerit radicem de rusco radicem de tribulo radicem de sparago radicem de olisatro radicem appio radicem de petroselino puleio siccum allii capitinas . iii . semen de malua sicca uncia una porros iiii . cum radici nassuas bettonica cum radice sua siue sicca siue uiride radicem de uiola nasturtium ruta siluatica et si non domestica coriandrum anetum oleum quod sufficit.

some cases, the inclusion of *probata* may reflect the scribe's personal experience (or knowledge of others' experiences), but without further evidence, it remains impossible to know with certainty. Instead, as the example of Terenti(an)us showed, even recipes with detailed descriptions of use and what might seem to be convincing signs of personal experience may reflect information copied from an earlier source. Any instances of 'personal comments' contained within the text must therefore be read with caution. Three other aspects of this recipe, however, may be able to offer more reliable insights into its potential practicality.

As seen in Chapters 3 and 4, an investigation into recipe ingredients may shed light on its practicality. In this case, does the *Potionem probata ad ilica passio* rely on products that could have been obtained in the Carolingian world? The recipe lists eighteen different ingredients, all of which are entirely plant-based and could have been grown, found, or produced within the Frankish Empire. These include agrimony roots cooked in wine; the roots of butcher's broom, caltrop, asparagus, alexanders, celery, parsley, and violets; dried pennyroyal; three heads of garlic; one ounce of marshmallow seeds; four leeks with roots; betony, with its roots either dried or fresh; cress; wild rue, or cultivated if necessary; coriander; dill; and oil. The use of such locally available products suggests that that this recipe was highly practical.

Moving beyond the ingredients, two other features stand out: a) the inclusion of the unit *staupus*, and b) the recording of an ingredient substitution. Both of these topics deserve further analysis and will be addressed below. In short, the use of the vernacular term *staupus*, a measurement roughly equivalent to a cup, is a user-friendly addition that takes into account a changing linguistic environment in which classical terms for units may have been less easily understood. Secondly, the substitution suggestion (in this case, the use of cultivated rue if wild rue was unavailable) offers a practical solution to sourcing ingredients, a 'plan b' if the desired ingredient could not be obtained. These two features illustrate the importance of considering the entire recipe when investigating the question of practicality. The *Potionem probata ad ilica passio* thus serves as a useful example to transition from analysing recipes' ingredients, the focus of Chapters 3 and 4, to studying additional aspects of recipes and their collections, the focus of Chapter 5. In this chapter, I shall first assess the final two features noted in the opening recipe, the use of the term *staupus* and the inclusion of substitution instructions, within the entire manuscript sample. By tracing additional examples of the unit *staupus* and suggestions for substitutions, I argue that many recipes were recorded with their potential users in mind. In other words, these elements within recipes appear to reflect practical considerations, such as the linguistic environment and sourcing of ingredients, presenting useful, useable information to the individuals with access to the texts.

In the second half of the chapter, I shall explore the composition of recipe collections more generally. This final topic will approach the question of practicality by studying the process of compiling recipe collections and the sources for the medical knowledge contained within them. In this case, I shall trace the appearance of recipes from a late antique herbal, *De herba vettonica liber*, in the recipe sample analysed in this dissertation, identifying patterns in their distribution in MMCs. These patterns offer insights into the decisions made by scribes regarding source selection and presentation. Finally, an in-depth study of two related MMCs in csg. 44 and BAV pal. lat. 1088 has major implications for understanding the development and evolution of these collections. The intra-recipe features analysed in the first part of the chapter and the large-scale patterns in MMC composition identified in the second both speak to active scriptoria, evolving texts, and the production of recipe literature intended for practice.

1. *STAUPUS*: A VERNACULAR 'INTRUSION'[2]

Near the start of the *Potionem probata ad ilica passio*, the reader is instructed to cook agrimony roots in nine *staupos* of wine. This unit, a Latinised Germanic term, is roughly equivalent to a cup, beaker, or goblet. While the use of this term has not been extensively studied, its appearance in early medieval texts has been noted by a number of scholars, most of whom were more interested in defining its volume than

[2] McCormick, Origins of the European Economy, p. 713.

addressing its cultural and linguistic significance.[3] Benjamin Guérard, for example, suggested that the unit was just under a litre whereas Henry Sigerist interpreted it as a small cup and equivalent to one *cyathus*, approximately 50 mL.[4] More recently, Ulrich Stoll has described one *staupus* as comparable to one *hemina*, roughly 300 mL.[5] These fairly large differences indicate that a consensus has not been reached. Yet attempting to define the unit with such precision seems anachronistic and inappropriate. For the present study, moreover, determining the exact volume of a *staupus* is not of great importance. Rather, an examination of the word's origins reveals that a Germanic term for a unit of measurement was incorporated into Carolingian medical texts: the word is related to the modern, though now archaic, German *Stauf* (beaker, cup) as well as the Norwegian *staup*, Swedish *stop*, Danish *støb*, MHG *stouf*, and OHG *stou(p)f*, ultimately stemming from a proto-Germanic **staupa*.[6]

Although past scholarship has primarily focused on defining the volume of a *staupus* and its relationship to classical units (*cyathus*, *hemina*), a number of historians have also commented on its significance. While *staupus* is only recorded twice in the collections transcribed and edited by Julius Jörimann, he makes a special note of its occurrence: when describing the practicality of many of the recipes' measurements, including 'simple' units such as a 'handful' or 'eggshell-ful', he highlights the Germanic influence indicated by the use of *staupus*.[7] Michael McCormick similarly comments on the 'intrusion of [this] Frankish vernacular term' in the *Lorscher Arzneibuch*, writing that the use of *staupus* indicated that 'the Lorsch physician

[3] For more general studies of weights and measures, see Sigerist, 'Maße und Gewichte in den medizinischen Texten des frühen Mittelalters', pp. 439-44 and Bischoff, *Anecdota novissima*, pp. 169-70 ('Maße und Gewichte zur Zeit Papst Hadrians I. (772-795)'). See also Isidore of Seville's section on weights and measures in Book XVI (Isidore of Seville, *Isidori hispalensis episcopi: Etymologiarum sive originum*).

[4] Guérard, Polyptyque de l'abbé Irminon de Saint-Germain-des-Prés, I, p. 188; Sigerist, Studien und Texte, p. 175.

[5] Stoll, Das 'Lorscher Arzneibuch', p. 40.

[6] J. Grimm and W. Grimm (eds), *Deutsches Wörterbuch*, 32 vols (Leipzig, 1854-1961), XVII, pp. 1169-74.

[7] Jörimann, Frühmittelalterliche Rezeptarien, p. 90.

composed or reformulated recipes which he actually used'.[8] While I agree with both scholars that the inclusion of this unit is noteworthy, I think that McCormick has overinterpreted its meaning in the *Lorscher Arzneibuch*, perhaps unaware that these instances were not unique. Indeed, in the sample of recipes analysed in this dissertation, I have identified 100 examples of the term, totalling sixty-nine separate recipes that use *staupus* at least once. Furthermore, these recipes are found in nine different manuscripts, representing a range of scriptoria and covering the entire period in question.[9] Such numbers indicate that the use of *staupus* in the *Lorscher Arzneibuch* should not be read as a distinctive addition by the 'Lorsch physician', but as part of a larger, though no less significant, pattern. Rather, the wide-ranging use of the term reflects a more general incorporation of this Germanic vocabulary and suggests a practical adaptation: a more readily understood vernacular term was used in recipes instead of a less familiar classical unit.

Looking more closely at the contexts in which *staupus* appears within the recipe sample, several key features emerge. First, in the majority of cases, the term occurs in recipes that use primarily, if not entirely, local ingredients, such as the chapter's opening example and is used most frequently as a unit of measurement for wine, vinegar, water, oil, and honey. These are among the most common liquid or semi-liquid products listed in recipes so this frequency is not surprising. In some recipes, the unit is even used with the notably local substances highlighted in Chapter 3, such as beer. The recipe *Ad glandolas siccandas* of csg. 44, for example, ends with *sex staupos de ceruisa*.[10] The use of *staupus* for these products adds further weight to

[8] McCormick, Origins of the European Economy, p. 713.
[9] The manuscripts in which the term is found include: csg. 44 (6 references, 5 recipes), csg. 751 (60 references, 38 recipes), csg. 752 (1 reference, 1 recipe), csg. 759 (12 references, 9 recipes), csg. 761 (1 reference, 1 recipe), BAV pal. lat. 1088 (2 references, 2 recipes), BAV reg. lat. 1143 (3 references, 3 recipes), Paris BnF lat. 2849A (14 references, 9 recipes), and Paris BnF lat. 9332 (1 reference, 1 recipe).
[10] Csg. 44, p. 353, *Ad glandolas siccandas*. This recipe is notable not simply for its connection of *staupos* and *ceruisa*: it also records an instance of *azaro*, which, in Chapter 4, I argued should be interpreted as 'hazelwort'.

the argument that adaptations, in these cases relating to both language and ingredients, were made to suit local conditions.

One recipe for jaundice in csg. 759, *Ad yctericus*, however, presents an interesting contrast. In this recipe, *staupus* is paired with garum, the famous Roman fish sauce.[11] In this case, the use of *staupus* with this particularly Roman ingredient suggests that medical knowledge from classical sources was adapted to suit the needs of contemporary users: by employing a Latinised vernacular term, the recipe would be more comprehensible to the text's readers. This example, moreover, underlines the fusion of information and sources evident in these recipes, a topic to be addressed in more detail in the second half of this chapter.

This brief case study reviewing the use of the term *staupus* illustrates how aspects of recipes distinct from (though still related to) their ingredients can also offer insights into the question of practicality. The introduction of a Latinised vernacular term in Carolingian medical texts indicates that the recipe literature was an evolving body of knowledge and adapted to make the texts more accessible. The repeated use of this term speaks to the practicality of the medical knowledge recorded alongside it. While earlier studies highlighted singular examples of *staupus* and drew conclusions from these isolated instances, I argue that it is the repeated occurrence of this unit that is even more noteworthy, speaking to a large-scale adaptation of material that made texts more understandable for their potential readers. Just as in the previous chapters, these findings were only made possible by analysing such a large sample, emphasising, again, the importance of large datasets and contextualised studies.

2. Wild vs. cultivated rue: The appearance of an ingredient substitution

Near the end of the *Potionem probata ad ilica passio*, the author comments on the type of rue to include in the preparation: wild rue is preferred but, if not available,

[11] Csg. 759, p. 93: **Ad yctericus** collegis atriplicis satis et in enio mittis ut . diutissime bulliant postea in tina mittis et quomodo refrigerat ibidem balneare debit et antequam ibidem intret de ipsa aqua pleno staupo bibere debit facis hoc per triduum et in quarto die bibat garo staupo dimedio et postea fleotomas.

cultivated rue is an acceptable substitution.[12] These instructions provide practical advice for what to do if wild rue is not obtainable and recommend a nearly-identical plant with which to replace it. Whatever the reason for preferring wild rue (perhaps the wild type was thought to be stronger than the domesticated variety and thus favoured), this comment implies that it was not always available. Might this recipe incorporate knowledge gained through experience? An analysis of information regarding ingredient substitutions within recipes presents another perspective on the question of practicality: such notes within ingredient lists offer practical solutions to sourcing unavailable ingredients.

Within the recipe sample, I have identified nineteen examples of substitutions recorded as part of the recipe's main text (following the model of the opening example) and one instance of a marginal gloss next to the recipe it concerns. Like the *Potionem probata ad ilica passio*, some substitutions suggest replacing wild-type ingredients with their cultivated equivalent, such as the substitution recorded in a recipe for wounds in csg. 44: 'it is better to use the leaves of wild parsnip than the cultivated type. If you cannot find wild parsnip, use the cultivated one'.[13] In other cases, closely related plant species are used as substitutes, such as rocket and mustard, both members of the Brassicaceae family. The *Antidotum ad stomaco frigido* of csg. 751 recommends using mustard seeds (*senapi semen*) if rocket seeds (*erucae semen*) are unavailable.[14] Alternatively, where multiple parts of the ingredient in question may be used (such as its leaves, seeds, fruits, roots, and/or wood), one part of the plant is listed as a possible replacement for another. A recipe for expelling worms found in three different manuscripts, for example, suggests substituting cannabis leaves (*folia de cannabe*) for cannabis seeds (*semen de cannabe*) if necessary.[15]

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[12] BAV reg. lat. 1143, f. 185^{r}: ruta siluatica et si non domestica.
[13] Csg. 44, pp. 330-1: Item aliud ad fagidinica ulcera… melior enim est pastinace siluestris folia quam domestice. Si non inuenis agrestem domesticam uteris.
[14] Csg. 751, p. 448: Antid<u>otum</u> ad stomaco frigido.
[15] Csg. 44, p. 350: **Item ad ipsum** (Contra uermes); csg. 751, p. 423: Item (Ad serpentes uel alios uerme de omine expellendum); BAV pal. lat. 1088, ff. 37^{r}-37^{v}: **Item** (Ad serpentes uel aliorum uermes de homine expellendum). On cannabis production, see M.-P. Ruas, 'Productions agricoles en Auvergne carolingienne d'après un dépotoir découvert à Saint-

Eleven of the substitutions concern exotic ingredients. Although the recommended replacements are generally similar products, such as the substitution of cassia or Chinese cinnamon (*cassia*) for cinnamon (*cinamomum*) in the *Anthidotus teodori* of BAV reg. lat. 1143, others are not so clearly related, or at least not to a modern reader.[16] Take, for example, the substitution listed in a treatment for incontinence in csg. 761: if pepper (*piper*) is not available, use natron (*nitri*).[17] Regardless of the efficacy of the substitution in question, the inclusion of instructions for how to proceed when the desired ingredient is not available represents a very practical addition to a recipe.

These types of instructions for replacing ingredients must be considered in relation to a late antique pseudo-Galenic text, *Περὶ ντεμβαλλομένων*, 'On substitute drugs', that addresses this very topic. The treatise contains a list of 369 ingredient substitutions.[18] Latin versions of the text have circulated under a variety of names; the title *Antemballomena*, based on a direct transliteration of the Greek title into Latin, is most frequently seen in the surviving early medieval texts, though the manuscripts preserve a high level of orthographic variation (Paris BnF lat. 6882A, for example, includes a version entitled *Antebalumina galieni* while BAV reg. lat. 1260 contains two copies with similar titles, the *Anteboluminis* and *Antebalunnia*).[19] Early printed

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Germain-des-Fossés (Allier)', Revue archéologique du centre de la France 39 (2000), 137-60; C. C. Bakels, 'Crops produced in the southern Netherlands and northern France during the early medieval period: a comparison', Vegetation History and Archaeobotany 14 (2005), 394-99; and R. C. Clarke and M. D. Merlin, Cannabis: Evolution and Ethnobotany (Berkeley, 2013).

16 BAV reg. lat. 1143, ff. 81^{r}-82^{r}: *Anthidotus teodori*.

17 Csg. 761, p. 56: *Ite<u>m</u>* (*Ad incontinentiam*).

18 K.-D. Fischer, 'Drugs to Declare. Two Pharmaceutical Works Attributed to Galen', *Cuadernos de Filología Clásica. Estudios griegos e indoeuropeos* 28 (2018), 225-41, pp. 233-9; A. Touwaide, 'Quid pro Quo: Revisiting the Practice of Substitution in Ancient Pharmacy' in A. Van Arsdall and T. Graham (eds), *Herbs and Healers from the Ancient Mediterranean through the Medieval West: Essays in Honor of John M. Riddle* (Farnham, 2012), 19-61.

19 Paris BnF lat. 6882A; BAV reg. lat. 1260. The latter codex, a ninth-century manuscript composed in Fleury, was not reviewed in Chapter 2 since it does not contain unattributed medical recipes, though it does include a number of other medical writings, such as the two *Antemballomena*. See Beccaria, *I Codici di medicina del periodo presalernitano* for a list of the surviving early medieval copies of *Antemballomena*.

editions of the text were given the name *De succedaneis* and this remains what is most frequently associated with the treatise despite the popularity of *Quid pro quo* in the later middle ages.[20]

A comparison of the twenty substitutions I recorded to those listed in *De succedaneis* reveals only one direct parallel: the replacement of cinnamon with cassia.[21] However, when considering the different categories of substitutions highlighted above, a number of similarities can be found between the substitutions in the recipe sample and the information contained in *De succedaneis*. The replacement of one part of a plant with a different part of the same plant, for example, also occurs in *De succedaneis*: lovage roots are offered as a possible substitute for lovage seeds.[22] On the other hand, some categories of substitution seen in the recipe sample, such as the substitution of cultivated plants for their wild-type or *vice versa*, appear to be missing from the pseudo-Galenic text.

These findings suggest that many of the notes on substituting ingredients located within recipes, and especially those that suggest replacing a wild plant with a domesticated variety, might not be directly descended from the late antique traditions recorded in early medieval *Antemballomena*, reflecting, perhaps, personal experience or a different source of information. However, the broad similarities between substitutions seen in recipes and those recorded in *De succedaneis*, combined with the cassia-cinnamon parallel, indicate that recipes' intra-textual comments on substitution are likely related to the earlier source, if indirectly. The fact that so many *Antemballomena* circulated alongside remedy collections suggests that this literature may have influenced the scribes responsible for these manuscripts. Given the recording of new substitutions within this mixed textual environment, it is possible that the information preserved within recipes combines both earlier traditions with practical experience. In other words, the existence of substitution lists could have inspired the continued recording of substitution instructions as and when needed. I

[20] Touwaide, 'Quid pro Quo', p. 19.
[21] Ibid, p. 37 (for Touwaide's helpful table of *De succedaneis*, see pp. 34-60.)
[22] Ibid, p. 39.

argue that the inclusion of this information within recipes represents a practical addition, showcasing scribes' attention to all of the elements in these manuscripts and active engagement with the material at their disposal.

3. SUMMARY

While Chapters 3 and 4 explored practicality by investigating the feasibility of obtaining ingredients, various features of the *Potionem probata ad ilica passio* have illustrated that there are a number of different ways, including units of measurement and substitutions, to examine the potential practicality of recipes. The brief case studies presented above highlight the utility of these topics as alternative entry points into this discussion. While ingredient analysis may offer more ways to approach the question of practicality, the above examples indicate that the consideration of recipes in their entirety can provide valuable complementary information: the inclusion of a vernacular unit and substitution instructions represent two ways that recipes incorporated practical features that would have aided a reader consulting these texts. These additions to the recipes suggest that this material was intended to be used in medical practice.

The goal of this chapter is to broaden the scope of analysis, exploring the question of practicality in a wider context. While the two case studies above looked at elements within recipes in addition to their ingredients, the breadth of analysis can be expanded further. In the second half of this chapter, I shall consider the composition of recipe collections, focusing on the transmission of knowledge and the information it can reveal about how these texts were produced. This broadest level of analysis provides yet another perspective on the potential practicality of this knowledge by addressing the process of compilation.

The composition of recipe collections

Although Chapters 3 and 4 identified ingredients unrecorded in classical medical texts, when the entire corpus of early medieval medical writings is surveyed, the significance of classical and late antique Mediterranean sources is clear.[23] It must be remembered that the case studies highlighted in these chapters represent specific examples within a much larger body of medical knowledge. As discussed in Chapters 1 and 2, many recipes are derived, either directly or indirectly, from classical and late antique traditions—even within the sample of unattributed recipes analysed in this dissertation.[24] It is the combination of different sources, including the influence of some non-classical material, that has resulted in these blended texts and their subsequent label of 'miscellaneity'. This label, however, does not mean that classical and late antique influences are lacking from the recipes involved in this dissertation.[25]

Given this patchwork of sources, I suggest that an investigation into the transmission of classical knowledge can also be used to provide a perspective on the question of practicality, illuminating aspects of the selection and composition processes that underpin early medieval recipe collections. In particular, an analysis of the sources of individual recipes may reveal the texts that the compilers of recipe collections consulted and uncover patterns in the types of information they decided to include or exclude. The following case study investigates the question of practice from this angle, tracing the transmission of recipes derived from the late antique herbal *De herba vettonica liber* and considering its wider implications.

1. Background to *De herba vettonica liber*

Pseudo-Antonius Musa's *De herba vettonica liber* offers the ideal text to analyse for several reasons.[26] First, given the number of extant early medieval copies of *De herba vettonica liber*, the text appears to have been fairly popular. Augusto

[23] Peregrine Horden's succinct assertion is, again, fitting: 'early medieval medicine is ancient medicine. It derives substantially from ancient sources' (Horden, 'What's Wrong with Early Medieval Medicine?', p. 19). See Chapter 1 for a further discussion of this topic.
[24] On the existence of 'pan-European healing traditions', see, for example, Van Arsdall, *Medieval Herbal Remedies* (while Van Arsdall addresses common traditions in several places, the quotation comes from p. 69); D'Aronco, 'The Transmission of Medical Knowledge in Anglo-Saxon England, pp. 37-8.
[25] See Chapter 2 for a review of the recipe literature and label of miscellaneity.
[26] Pseudo-Antonius Musa, *De herba vettonica liber*, pp. 3-11.

Beccaria has identified fourteen copies or extracts of *De herba vettonica liber* in pre-Salernitan manuscripts, including two of the codices involved in the present study, csg. 761 and Paris BnF lat. 13955.[27] Moreover, the text was translated into Old English and survives in several insular manuscripts, highlighting its widespread distribution.[28] As one of the texts that makes up the *Herbariencorpus*, *De herba vettonica liber* is often found alongside several other herbals and bestiaries, including Pseudo-Apuleius' *Herbarius*, Pseudo-Dioscorides' *Ex herbis femininis*, Sextus Placitus' *Liber medicinae ex animalibus, pecoribus et bestiis*, Pseudo-Hippocrates' *Epistula ad Maecenatem*, and the anonymous *De taxone liber*.[29] The popularity and widespread distribution of *De herba vettonica liber* suggest that it could have been a potential source for or influence on individual recipes within unattributed recipe collections.

Secondly, two features of *De herba vettonica liber* mark this text as a particularly assessable reference point. The recipes contained within this treatise are simples based on the use of the plant betony, *Stachys officinalis*. In other words, these are very short recipes whose primary ingredient is betony, though they may also include a handful of other ingredients (usually only as emollients or liquifying agents). A recipe to treat 'weepy eyes', for example, simply recommends that the patient should chew betony.[30] The minimalism and consistency of these recipes (betony is always listed first) stands out, making these recipes relatively easy to identify within the sample. Furthermore, the entire text of *De herba vettonica liber* contains only forty-seven recipes, all of which target a specific condition, such as head fractures, kidney

[27] Beccaria, I Codici di medicina del periodo presalernitano, p. 440.
[28] Voigts, 'Anglo-Saxon Plant Remedies and the Anglo-Saxons', pp. 255-9; Beccaria, *I Codici di medicina del periodo presalernitano*, p. 440.
[29] Voigts, 'The Significance of the Name Apuleius to the *Herbarium Apulei*', p. 215; Riddle, 'Pseudo-Dioscorides' *Ex herbis femininis* and Early Medieval Medical Botany', p. 51. As noted in Chapter 2, Gerhard Baader has labelled this collection of texts the *Herbariencorpus* and locates their grouping to sixth- or seventh-century Ravenna, see Baader, 'Die Anfange der medizinischen Ausbildung in Abendland bis 1100', pp. 669-772.
[30] Pseudo-Antonius Musa, De herba vettonica liber, p. 5: Ad lacrimosos oculos: Vettonicam manducet, aciem oculorum clariorem facet.

pain, or gout.[31] The shortness of the treatise makes it possible to compare all instances of betony that occur in recipe sample to each remedy within *De herba vettonica liber*. The size and scope of this text as well as its emphasis on betony thus make *De herba vettonica liber* uniquely suited to a case study.

2. Review of the recipes derived from *De herba vettonica liber*

In the 4335-recipe sample, I identified seventy-eight recipes that parallel entries in *De herba vettonica liber*, representing nearly two percent of the unattributed recipes under consideration. I shall review patterns in the shared material (and in what has been omitted) before analysing, in the following section, the contexts and distribution of these recipes within the sample.

First, it must be noted that the seventy-eight parallel recipes do not include examples of each of the forty-seven treatments recorded in *De herba vettonica liber*. However, thirty-four recipes, nearly three-quarters of the text of *De herba vettonica liber*, do appear. The spread of this material is uneven and some recipes are repeated in several different manuscripts or occasionally twice in the same manuscript. At first glance, the inclusion or exclusion of recipes derived from *De herba vettonica liber* does not appear to follow an obvious pattern. Why, for example, does the recipe for stomach pain (*Ad stomachi dolorem*) from *De herba vettonica liber* occur in both csg. 44 and BAV pal. lat. 1088, but the treatment for colon problems (*Ad colum*) is not found in the entire sample of unattributed recipes?[32]

A closer investigation of the division of recipes, however, has revealed two trends that may help to explain the types of recipes that have and have not been included. In some cases, it appears that the material in *De herba vettonica liber* has been condensed. Consider, for example, the twenty-third and twenty-fourth recipes of *De herba vettonica liber*, *Ad uessicae dolorem* (for bladder pain) and *Ad cauculosos*

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[31] Pseudo-Antonius Musa, *De herba vettonica liber*, see recipe 1: *Ad capitis fracturam* (p. 4), recipe 13: *Ad renum dolorem* (p. 6), recipe 47: *Ad podagram* (p. 10).
[32] Pseudo-Antonius Musa, *De herba vettonica liber*, pp. 6-7; csg. 44, p. 363; BAV pal. lat. 1088, f. 37r.

(for sufferers of stones).[33] A recipe in csg. 44 with the title *Ad uisice dolorem et cauculum* and another in BAV pal. lat. 1088 similarly labelled *Ad uissice dolorem uel cauculum* both offer recipes nearly identical to that given in *Ad uessicae dolorem* of *De herba vettonica liber* but appear to have merged the titles of this recipe and its neighbour, *Ad cauculosos*.[34] This compression is perhaps not surprising since in many cases the two conditions being treated may have been related. Similar examples of condensed material may be seen in other recipes, such as the treatments for snake bites: *De herba vettonica liber* lists two recipes but only one appears in the sample. This may also explain why recipes like *Ad colum* do not appear: perhaps *Ad stomachi dolorem* was considered sufficiently broad and made *Ad colum* somewhat redundant.

Secondly, an analysis of the distribution of parallel recipes within *De herba vettonica liber* reveals that certain parts of the text were more heavily mined than others. I have divided the forty-seven recipes into three groups based on their prevalence of shared recipes: a) recipes 1-23, b) recipes 24-35, and c) recipes 36-47. Over eighty percent of the recipes in groups (a) and (c) have parallel recipes in the manuscript sample whereas only one-third of the recipes in group (b) appear in the sample. Specifically, twenty-one out of the twenty-three recipes in group (a) have parallels in the recipe sample; for group (b), four out of the twelve recipes have parallels; and for group (c), ten out of the twelve recipes have parallels. This breakdown reveals that the recipes derived from the initial and final parts of *De herba vettonica liber* were included in collections of unattributed recipes much more often than those from the middle of the text. Notably, the examples of condensed recipes

[33] Pseudo-Antonius Musa, *De herba vettonica liber*, p. 8: *Ad uessicae dolorem: Vettonicae dragmas IV, apii radices dragmas III; decoque apii radices in sextario aquae ad medias; cum decoctum fuerit, uettonicam in se permiscebis, dabis bibere, dolorem in perpetuo sanat*; *Ad cauculosos: Vettonicae dragmas III ex aceto scilliticio et mellis unciam I et aquae calidae ciatos IX, bibat.*

[34] Csg. 44, p. 367: ***Ad uisice dolorem*** *et cauculum Betonica dragma . iii . apii radices scrupulos iii . de coquis apii radices in sestaria . aquae ad medias cum de coctum fuerit betonica in simul miscis et dabis bibere dolores tollit in praesenti*; BAV pal. lat. 1088, f. 41v: *Ad uissice dolorem uel cauculum uittonica ~ . iiii . apii radices scripulos . iii . de quoquis apii radices in aqua ad medias et cum coctum fuerit uittonica semper miscies . et sic dabis bibere dolorem in perpetuum sanat*.

appear primarily in groups (a) and (c) and therefore do not provide an immediate explanation for the lower degree of overlap in the middle recipes (excepting recipe 24). While this difference could relate to the particular preferences and needs of the scribes responsible for compiling the collections of unattributed recipes, I suggest that it may reveal a fragmented and indirect transmission process. Specifically, the total absence of several clusters of recipes, such as 26-29 and 31-32, from the entire manuscript sample may indicate that these sections of text were not included in the exemplars used by the scribes responsible for at least some of these collections. An analysis of the manuscripts and textual environments in which these recipes are found may help to account for this.

3. CONTEXT AND DISTRIBUTION OF THE RECIPES DERIVED FROM *DE HERBA VETTONICA LIBER* WITHIN THE MANUSCRIPT SAMPLE

The vast majority of the parallel recipes, seventy-two out of seventy-eight (92.3%), are found in MMCs. Although just over sixty percent of the recipes in the 4335-recipe sample are located in MMCs, the appearance of over 90% of the parallel recipes in these collections indicates that there is a stronger association between these recipes and MMCs than either smaller, unnumbered clusters of recipes or marginal additions. As shown in Table 5.1, an analysis of these seventy-two recipes reveals that the spread of parallel recipes within MMCs is also uneven. Examples of recipes related to *De herba vettonica liber* are recorded in neither the first MMC of csg. 44 (csg. 44A) nor the MMC of csg. 759.[35] While there are barely any examples of parallel recipes in the second MMCs of csg. 44 (csg. 44B) and csg. 751 (csg. 751B), three MMCs contain much higher frequencies: the third MMC of csg. 44 (csg. 44C) includes twenty-one examples of parallel recipes, the first MMC of csg. 751 (csg. 751A) displays eighteen parallels, and BAV pal. lat. 1088 contains thirty.[36] These three MMCs account for

[35] Csg. 44, MMC A covers pp. 228-60; csg. 759, the MMC covers pp. 58-94.
[36] Csg. 44, MMC B covers pp. 340-54 and MMC C covers pp. 357-68; csg. 751, MMC A is on pp. 355-414 and MMC B covers pp. 430-96; BAV pal. lat. 1088, the MMC is on ff. 33^{r}-50^{r}.

almost 90% of all instances of recipes related to *De herba vettonica liber* recorded in the recipe sample and over 95% of the parallel recipes in MMCs.

Two distribution patterns emerge within the three MMCs with the majority of parallel recipes. In csg. 751A, sixteen out of the eighteen parallel recipes are found on pp. 408-9, whereas the recipes in csg. 44C and BAV pal. lat. 1088 are spread throughout these two MMCs. In-depth studies of both of these distribution patterns may shed light on the structure and production of these collections; I shall first consider csg. 751A before assessing csg. 44C and BAV pal. lat. 1088 together.

Table 5.1
Parallel recipes in MMCs

MMC	# of parallel recipes	% of recipes in MMC
Csg. 44A (pp. 228-60)	0	0%
Csg. 44B (pp. 340-54)	1	0.4%
Csg. 44C (pp. 357-68)	21	6.7%
Csg. 751A (pp. 355-414)	18	4.1%
Csg. 751B (pp. 430-96)	2	0.3%
Csg. 759 (pp. 58-94)	0	0%
BAV pal. lat. 1088 (ff. 33^r-50^r)	30	4.6%

In csg. 751A, a deeper analysis of pp. 408-9 indicates that the tight cluster of sixteen recipes actually comprises two distinct groups (see Figures 5.1 and 5.2 for each page). First, a series of nine betony-based recipes begins near the top of p. 408 (one of the nine does not have a perfect match with a recipe in *De herba vettonica liber* but is also a simple that uses betony); the page ends with a section of recipes titled *Incipit de uulturio quod medicina in se habent* that rely on various parts of vultures. This text appears to be linked to the *Epistula Vulturis* identified by Loren MacKinney in Paris BnF lat. 9332.[37] The vulture text continues on p. 409 and is then followed by an

[37] MacKinney, 'An Unpublished Treatise on Medicine and Magic from the Age of Charlemagne', pp. 494-6.

additional eight recipes that overlap with treatments in *De herba vettonica liber*. The betony recipes on p. 408 mostly include recipes near the end of *De herba vettonica liber* and partially follow the original order of the text, as shown in Table 5.2. The second recipe in the cluster, *Ad uentre tumor*, is the only one within the group without a direct parallel in *De herba vettonica liber*, though it is fairly similar to the title of its sixteenth recipe, *Ad uentris dolorem*, whose instructions can be found in the cluster under the heading *Ad stomachi dolorem*. As the table indicates, the titles of five of these recipes match the treatments given in the text of *De herba vettonica liber*, while elements of the preface have been incorporated into three entries. For example, *Ad stomachi dolorem* and *Ad tumorem et dolorem testiculi*, whose titles parallel the tenth and fortieth recipes of *De herba vettonica liber*, include the phrase *uittonica in umbra arefacta* ('dry betony [leaves] in the shade'), a note that can be found in the treatise's preface.[38] Similarly, the preceding untitled entry notes that the plant should be harvested in August with its seeds and that its roots should be collected without an iron tool (*uittonica mense augusto collecta cum semen et radicibus suis sine ferro collecta*), information that likewise appears in the preface.[39]

[38] Csg. 751, p. 408. See note below for an excerpt from the preface to *De herba vettonica liber*.
[39] Csg. 751, p. 408. Cf. the preface to De herba vettonica liber: …Hanc autem suo tempore colliges, id est mense Augusto, cum ceterae herbae maturescere incipient, cum semine et radicibus, sine ferro eamque excussam, ne terra ei inhaereat, in umbra arefacies atque ita teres cum radicibus suis cribro aromatico... (Pseudo-Antonius Musa, De herba vettonica liber, p. 4).

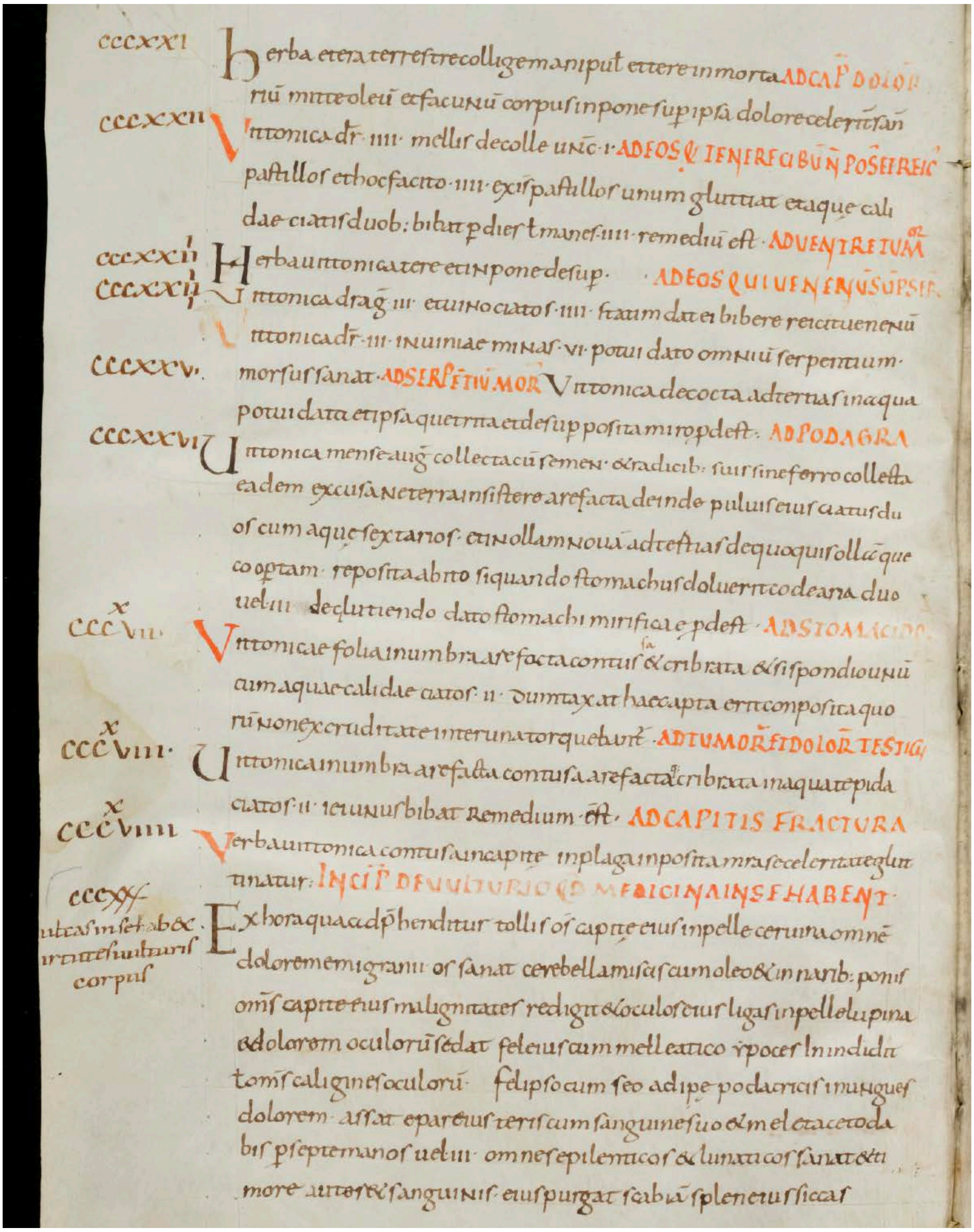

***Figure 5.1**: First cluster of recipes related to* De herba vettonica liber *(csg. 751, p. 408)*

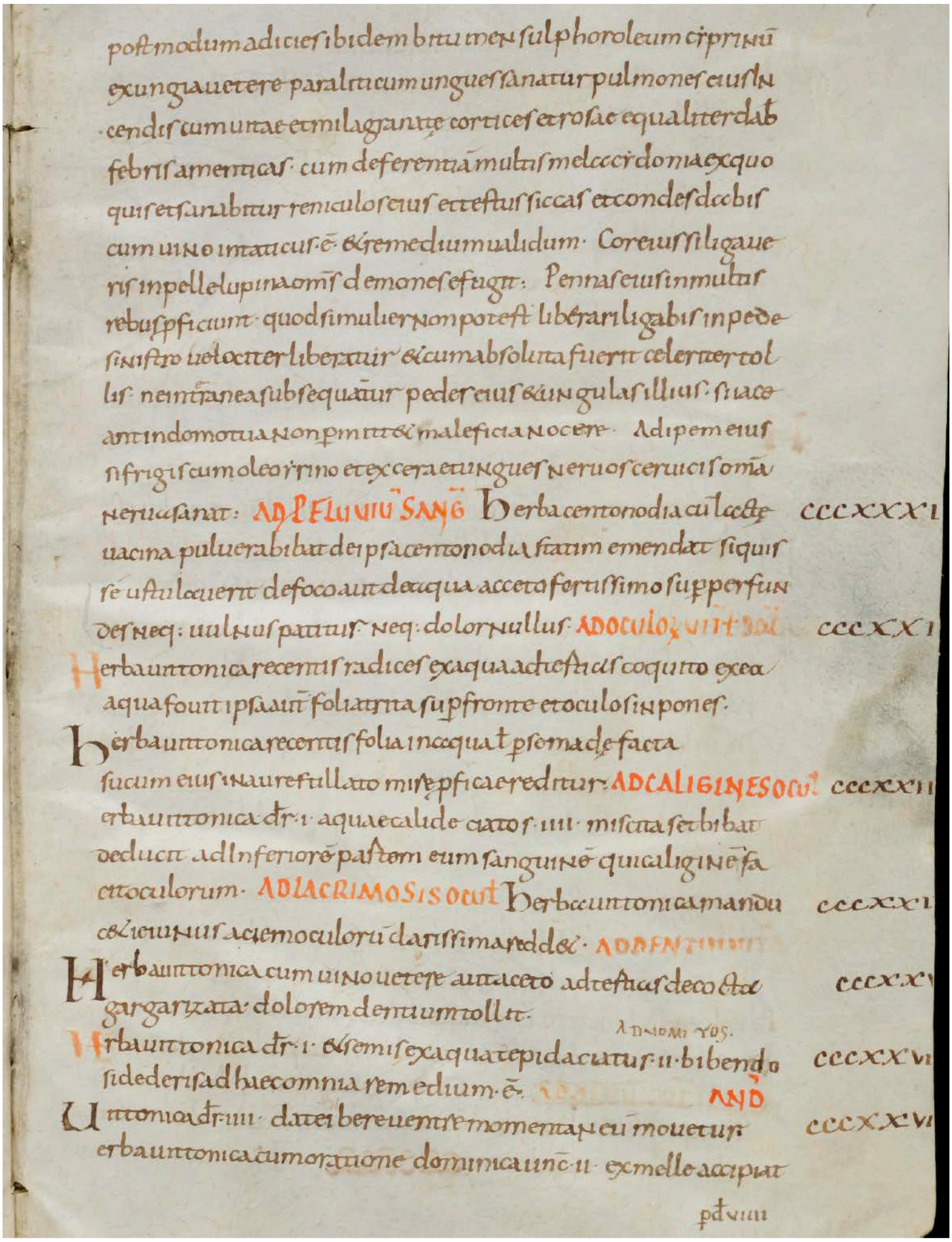

***Figure 5.2**: Second cluster of recipes related to* De herba vettonica liber *(csg. 751, p. 409)*

Table 5.2 The recipe cluster on p. 408 (csg. 751A)		
Title on p. 408	*De herba* recipe with parallel title	*De herba* recipe with parallel instructions
Ad eos qui tenere cibum non possunt et reiciunt	#39	#39
Ad uentre tumor	x / #16	x
Ad eos qui uenenum sumpserit	#41	#41
Ad serpentium morsum	#42	#42
Ad podagra	#47	#47
[untitled]	N/A	preface
Ad stomachi dolorem	#10	preface / #16
Ad tumorem et dolorem testiculi	#40	preface
Ad capitis fractura	#1	#1

Table 5.3 The recipe cluster on p. 409 (csg. 751A)		
Title on p. 409	*De herba* recipe with parallel title	*De herba* recipe with parallel instructions
Ad oculorum uitium uel dolorem	#2	#2
[untitled]	N/A	#3
Ad caligines oculorum	#4	#4
Ad lacrimosis oculorum	#5	#5
Ad dentium uitiae	#7	#7
Ad uomitos	#8	#8
Ad aluum conciandum	#17	#17
[untitled]	N/A	#19

A second betony cluster appears after the vulture text ends on p. 409, presenting a tighter and more consistent section paralleling *De herba vettonica liber*, as seen in Table 5.3. All eight recipes are from the first part of the text and, excluding one unlabelled recipe, both their titles and treatment instructions match recipes in *De* *herba vettonica liber*. The patterning seen in the sources for recipes on pp. 408-9 is striking: a cluster of recipes linked to *De herba vettonica liber* is split by a short section of recipes related to the *Epistula Vulturis*. Significantly, this treatise represents another text derived from classical and late antique sources, such as Sextus Placitus' *Liber medicinae ex animalibus, pecoribus et bestiis*, one of the texts often associated with *De herba vettonica liber* in the *Herbariencorpus*.[40] These three distinct textual groupings suggest that the scribe responsible for producing this MMC was either excerpting discrete units of each of these texts (or a related descendant) or was using an exemplar that already presented this structure. The somewhat disjointed state of the cluster on p. 408 reflects that the latter possibility is more plausible, representing an indirect transmission of this knowledge. Notably, the recipes on pp. 408-9 parallel recipes from only the beginning and end of *De herba vettonica liber*. This distribution, which includes recipes between numbers 1 and 19 and recipes between numbers 39 and 47, almost exactly follows the division of the two clusters (with one exception, *De capitis fracturam*) and fits with the pattern identified above: the recipes from the middle of *De herba vettonica liber* are entirely absent. Moreover, where the middle recipes might have been expected to have been found (namely, between the two existing sections of betony recipes), there are instead recipes from the *Epistula Vulturis* tradition, supporting the idea that these clusters were transmitted together.

In contrast, the recipes related to *De herba vettonica liber* in csg. 44C and BAV pal. lat. 1088 are spread throughout these MMCs. Unlike csg. 751A, where each recipe title corresponded to a single treatment, most of the entries in both csg. 44C and BAV pal. lat. 1088 contain several recipes. In other words, a title such as *Ad dentium dolorem* is followed by a handful of individual recipes; each entry is therefore like a small chapter that includes several treatments targeting the same ailment. In csg. 44C, for example, the entry for *Ad dentium dolorem* (shown in Figure 5.3) contains five recipes and the fifth parallels the seventh recipe of *De herba vettonica liber*, *Ad*

[40] Baader, 'Die Anfange der medizinischen Ausbildung in Abendland bis 1100', pp. 669-772.

dentium uitia.[41] Thus, individual recipes from *De herba vettonica liber* (or a descendant) appear to have been selected from this text and inserted into the relevant chapters in the MMC. The order in which the recipes appear in both MMCs does not follow the structure of *De herba vettonica liber*: for both csg. 44C and BAV pal. lat. 1088, the first five examples of parallel recipes correspond to recipes 36, 3, 4, 7, and 19 in *De herba vettonica liber*.[42]

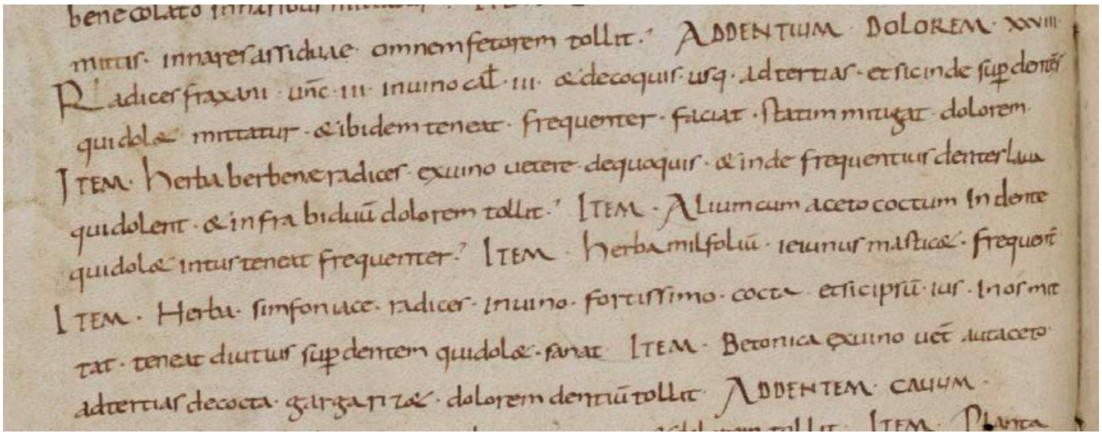

Figure 5.3*:* Ad dentium dolorem *(entry paralleling* De herba vettonica liber *begins halfway through line 8) (csg. 44, p. 360)*

The parity observed between the opening pages of these MMCs suggests that the two collections may stem from the same exemplar. Although a full analysis of these two collections was hindered by their incomplete survival, an assessment of their extant indices and recipes reveals a more complicated picture.[43] Just over half of the entries listed in the index of csg. 44C have been lost, whereas much of the second half of the index of BAV pal. lat. 1088 is illegible. It is apparent, however, that the two MMC indices record a different total number of entries: csg. 44C lists 153 titles while BAV pal. lat. 1088 presents 180. All surviving entries in csg. 44C (entries 1 to 77)

[41] Csg. 44, p. 360: **Item** . Betonica ex uino uet<u>ere</u> aut aceto ad tertias de cocta . gargarizet . dolorem dentium tollit.

[42] Csg. 44, pp. 358-362; BAV pal. lat. 1088, ff. 33^{v}-35^{v}; Pseudo-Antonius Musa, *De herba vettonica liber*, recipe 36: *Lassis de via* (p. 9), 3: *Ad aurium uitia uel dolores* (p. 5), 4: *Ad caliginem oculorum* (p. 5), 7: *Ad dentium uitia* (p. 6), and 19: *Ad tussim* (p. 7).

[43] Csg. 44: the index of csg. 44C can be found on pp. 354-6 and the MMC is on pp. 357-68; BAV pal. lat. 1088: the index is listed on ff. 31^{r}-33^{rc} and the MMC covers ff. 33^{r}-50^{r}.

match the titles listed in the index. The same cannot be said of the entries in BAV pal. lat. 1088. In this case, the recipe groups correspond to the titles listed in the index until entry 53. At this point, *Ad punctas* is expected based on the index, but instead a cluster of recipes under the title *Ad anum uermeniosum pulmonem* appears. While I have not identified this title in the index of BAV pal. lat. 1088, this is probably due to its poor preservation; the title can be found in csg. 44C's index, albeit twenty-three entries later. The next twelve recipe groups in BAV pal. lat. 1088 follow the order listed in the index of csg. 44C (from *Ad anum uerminosum* to *Ad coxarum dolorem*), thereby skipping twenty-three entries. These missed entries do, however, reappear in BAV pal. lat. 1088, but later in the collection. In total, I have identified at least five additional instances of similarly 'spliced' groups of entries. That is, a section of entries in BAV pal. lat. 1088 also appears in the index to csg. 44C, but their order has been rearranged. Significantly, since the changes do not occur at the ends of folios, it is clear that the reordering did not result from a binding (or later rebinding) error.

In contrast to the recipes themselves, the index of BAV pal. lat. 1088 appears to correspond with the index of csg. 44C for a larger percentage of the entries, though it is difficult to compare the two in the second half of the collection given the poor preservation of the index in BAV pal. lat. 1088. The difference in the total number of entries given by the two indices looks as if it is due to two changes in BAV pal. lat. 1088: a section of eighteen recipes has been repeated and additional entries have been included at the end of the collection. The final entries of the index are partially visible and reveal that these additions to the text were also noted in the index. Their inclusion here reflects the intentional, ordered addition of this material to the MMC rather than its insertion at a later date.

The large degree of overlap between these two MMCs, though presented in a different order, suggests that these collections are predominantly based on the same source, closely related exemplars, or perhaps one MMC is even based on the other. Regarding the latter option, it seems more probable that BAV pal. lat. 1088 used csg. 44C as an exemplar, copying the index of csg. 44C, but restructuring the order of the recipes themselves and adding additional material at the end. According to Bernhard

Bischoff, csg. 44 was produced in northern Italy and BAV pal. lat. 1088 in Lyon.[44] While it is thought that csg. 44 left its original environment soon after its composition, it does not appear to have gone to Burgundy, instead moving north to St Gall (where it has since remained). Both codices have also been dated to roughly the same period, no earlier than the middle of the ninth century.[45] This information suggests that BAV pal. lat. 1088 was not copied from csg. 44 directly and that both are therefore based on an earlier exemplar (or related exemplars), a topic considered in more detail below.

4. Implications of the analysis of recipes derived from *De herba vettonica liber*

Henry Sigerist presented a number of similar recipe collections in *Studien und Texte zur frühmittelalterlichen Rezeptliteratur*. In his analysis of these texts, he suggested that new collections of recipes were assembled for the needs of the monastic community.[46] The above case study, however, suggests that these three MMCs were not entirely new compositions but collections based on earlier exemplars. Sigerist's comment must therefore be reassessed: a) to what extent are these 'new' collections? And b) do they reflect the needs of the community in which they were written or for which they were intended?

There are two ways to answer the question of 'newness'. On one hand, each text is new given every manuscript's unique codicological context and the nature of copying texts by hand; intentional, content-related changes made by the scribe(s) responsible for the text's production introduce another degree of newness.[47] On the other hand, two of the MMCs in question appear to have been based on the same or similar exemplar, meaning that the *majority* of their material is not new. In short, while

[44] See Chapter 2 for more details; Bischoff, *Katalog der festländischen Handschriften*, III, pp. 301 and 418.
[45] Bischoff, Katalog der festländischen Handschriften, III, pp. 301 and 418.
[46] Sigerist writes: 'So glaube ich denn auch, daß wir in den meisten Fällen originale Kompilationen vor uns haben, Sammlungen, die sich der Schreiber für seine klosterärztlichen Bedürfnisse zusammenstellte' (Sigerist, *Studien und Texte*, p. 186).
[47] Leja, 'The Sacred Art', p. 4; Wallis, 'The Experience of the Book', pp. 105-43; Horden, 'What's Wrong with Early Medieval Medicine?', p. 17.

these are inherently new texts, they are also part of a dynamic tradition of related collections—and it is this dynamism that can help to answer (b). Although the MMCs of csg. 44C and BAV pal. lat. 1088 are clearly related, their differences, such as the reordering of recipes and addition of material, stand out. Given that the date of the original exemplar is unknown (though I shall return to that question below), I suggest that these differences offer the most concrete information to modern scholars regarding the production of the texts and those responsible for them. While the repetition in the index of BAV pal. lat. 1088 suggests that some alterations in this MMC were probably due to scribal errors, other differences appear to be linked to the use of this material. The inclusion of additional recipes in the body of text *and* their notation in the index, for example, reveals an intentional, planned update to the collection. Indeed, these revisions may reflect the recipes that the scribe(s) found to be most relevant to their own experiences: among the final extra entries are recipes for taking care of bee or wasp stings and getting rid of fleas.[48] These two instances of differences between the MMCs indicate that modifications to the text should not be automatically read as changes made to benefit the community; in some cases, they may simply represent errors. However, when analysed in context, some differences, such as the addition of more recipes, suggest that the individuals who produced these collections actively updated the material, recording practical information with its users in mind.

The findings presented in this final case study thus uphold Sigerist's comments overall, though they also offer a more complex picture. By considering what it means to be a 'new' text and how aspects of these 'new collections' have the potential to reflect practical developments, this case study offers a more nuanced take on Sigerist's original statement.

Conclusion: Practicality in context

While Chapters 3 and 4 concentrated on the ingredients of recipes, this chapter has considered a wider range of material, moving first to an analysis of recipes in their

[48] BAV pal. lat. 1088, f. 47^{r}, see Ad apiu<u>m</u> uel uesparu<u>m</u> ictos and Ad pulices effugandos.

entirety and then to recipe collections more generally. Each of the three case studies presented above, on units, substitutions, and sources, provided a different perspective on the question of practicality. First, the wide-ranging inclusion of the unit *staupus* suggests that Carolingian scribes took into account the local linguistic environment and made recipes more 'user-friendly' by incorporating a vernacular unit of measurement. Secondly, the integration of instructions for substituting ingredients presents a practical addition to recipes, offering options for alternative ingredients if a particular substance was unavailable. Finally, by tracing the transmission of recipes related to *De herba vettonica liber*, it was possible to investigate the compilation of recipe collections. While it appears that the MMCs analysed in this case study were based on earlier exemplars, it is the 'new' elements in each text, such as the addition of recipes, that can provide further insights into their uses and users. When these three distinct case studies are read collectively, they build a strong argument for practicality. The inclusion of the unit *staupus*, the addition of substitutions, and the planned insertion of additional recipes in BAV pal. lat. 1088 suggest that these texts were intended to be used in the practice of medicine: each development showcases ways in which texts were modified to aid their users.

While the final case study of Chapter 5 explored the composition of three MMCs, it can also shed light on the production of medical manuscripts more generally, a topic that unites not only the three case studies of this chapter, but also Chapters 3-5. The inclusion of recipes derived from *De herba vettonica liber* in the MMCs analysed above suggests that a systematic selection process was involved in the composition of a new text, whereby multiple sources were consulted and sections of text or individual recipes selected. In the example of csg. 751A, where recipes from *De herba vettonica liber* were grouped in clusters, it appears that sources were inserted into the MMC as distinct units. The MMCs of csg. 44C and BAV pal. lat. 1088 show a different method of selection and structuring: the collections are ordered by condition, so recipes from a variety of sources are listed under a single heading. While the latter MMCs exhibit a more complex process of composition that involved extensive reorganisation of multiple sources, both cases indicate that a number of different texts were used to create a new collection of recipes.

How insightful are these findings if all three MMCs were based on earlier exemplars? Do the editorial processes reviewed above reflect the workings of late antique compilers instead of Carolingian scribes? Since all three manuscripts date from the middle or second half of the ninth century, it is possible that they are based on early Carolingian works that have not survived. By considering these MMCs and their composition in the context of the Carolingian renaissance, I suggest that this option is probable.

Although medicine has traditionally been viewed as somewhat removed from and less affected by the Carolingian reforms, Meg Leja's recent work has situated medical texts within this framework.[49] By focusing on the late eighth- or very early ninth-century *Lorscher Arzneibuch*, Leja has demonstrated that the scribes responsible for this manuscript were 'engaging with the key impulses of the Carolingian *correctio*'.[50] Given the evidence for the creation of MMCs, such as the books of the *Lorscher Arzneibuch*, in the initial phase of the Carolingian renaissance, it is clear that the exemplars on which csg. 751A, csg. 44C, and BAV pal. lat. 1088 are based *could* have been produced at this time. Moreover, eight of the manuscripts studied in this dissertation were produced in this early period, confirming that the late eighth- and early ninth-century burst in manuscript production was keenly felt in the medical arena.[51] Although these eight manuscripts do not all contain MMCs, they do exhibit many of the 'key impulses' of *correctio*, such as the return to and reclamation of classical knowledge and the attention paid to the presentation and ordering of texts—features which are also evident in the collections made throughout the following century. Therefore, given the surviving examples of medical manuscripts that appeared in the immediate wake of the project of *correctio* and the parallels seen in

[49] Leja, 'The Sacred Art', pp. 1-34; See also the discussion in Chapter 1.
[50] Leja, 'The Sacred Art', p. 2; Bamberg, Staatsbibliothek, Msc. Med. 1; Stoll, *Das 'Lorscher Arzneibuch'*.
[51] The eight manuscripts are: csg. 217, csg. 759, csg. 761, csg. 1396, BAV lat. 5951, BAV reg. lat. 1143, and Paris BnF lat. 9332.

ninth-century manuscripts, I argue that many of the later Carolingian MMCs were based on exemplars produced during the first wave of scholarship in the late eighth and early ninth centuries.

The backdrop of the Carolingian world, and especially its particular intellectual climate that focused on improving literacy and education and encouraged a return to older authorities, tie Chapters 3-5 together. In medicine, I argue that these Carolingian impulses are seen not only in the Christianised redeployment of classical knowledge or the attention given to the order and presentation of recipe collections, but also in the emphasis on accessibility, as documented by features such as the incorporation of the unit *staupus*. Textual adaptations that took into account growing numbers of readers from different linguistic backgrounds thus showcase both the Carolingian educational project as well as changes that would have made the use of these recipes in medical practice easier. The inclusion of locally available products, such as the alcohols reviewed in Chapter 3, extends these practical adaptations further. The exotic ingredients highlighted in Chapter 4 showcase a different side to practicality: while I argued that *exotica* from the far east were probably only available rarely, in small quantities, and at great expense, their introduction to recipes during this period speaks to the existence of long-distance networks of trade and communication and suggests that recipes stored 'latent knowledge'. This material was ready to be used if and when the ingredients were available.

Ultimately, the evidence presented in Chapters 3-5, especially when considered in context, speaks to the practicality of many of the recipes recorded in the manuscripts analysed in this dissertation. The combination of large-scale analysis and detailed case studies strongly suggests that these therapies were generally written with the intention of being used in the practice of medicine.

Part 2

Applicability

Chapter 6
Reading Recipes in Light of Osteological Evidence

Moving from practicality to practice: An investigation of applicability

Having explored the practicality of recipes in Part 1, I shall now investigate the question of applicability.[1] While the preceding case studies highlighted the practical nature of many of these recipes, it did not consider whether this information was potentially useful or relevant, and a recipe's usability (i.e., its practicality) and utility (i.e., its applicability) should not be conflated. As discussed in Chapter 2, examples of individuals who sought to *apply* medical writings are few and far between (Bishop Cynehard represents one of the few exceptions—though he was presumably somewhat unsuccessful in his use of the texts given his complaints about lacking some of the ingredients listed in the recipes).[2] The second part of this dissertation, therefore, asks: were these recipes applicable to individuals in early medieval Europe? In other words, do they address health concerns that affected people in this period?

As noted in Chapter 1, the question of applicability is new for medieval medicine and may cause some confusion since it is generally assumed that medical knowledge, due to its very nature, had direct relevance to contemporary populations. This assumption, however, must be questioned. The situation is more complex because, as Peregrine Horden has demonstrated, knowledge may be recorded, preserved, studied, and passed on for a multitude of reasons, and practical application represents just one of these reasons.[3] Moreover, modern scholarship has highlighted that a variety of options were available in the 'medical marketplace', but many of these approaches to healing did not necessarily involve medical writings, whether as

[1] For this dissertation's definitions of practicality and applicability, see Chapter 1.
[2] Wallis, Medieval Medicine, pp. 110-11; Die Briefe des heiligen Bonifatius und Lullus, MGH. Epistulae selectae, Letter 114, p. 247: sed tamen [p]igmenta ultramarina, quae in eis scripta conperimus, ignota nobis sunt et difficilia adipiscendum.
[3] Horden, 'The Uses of Medical Manuscripts', pp. 1-6.

teaching texts or guides to be consulted in practice.[4] An examination of the applicability of these recipes thus has the potential to cast fresh light on relationship between medical knowledge and practice.

This chapter introduces the dissertation's investigation of applicability, first outlining why we should question the medical texts' relevance to populations in the Carolingian world, a topic touched on in Chapter 1 but now elaborated in more detail. This discussion connects to how the following chapters use the osteological record to re-evaluate the evidence presented by the recipe literature. I then address some of the challenges inherent in bringing together these two bodies of evidence and how certain challenges have helped to determine the foci of the following case study-based chapters. This leads into an overview of the chapters' analytical framework, including a review of the archaeological sites considered in the case studies.

Establishing the framework for Part 2

1. Why question the relevance of recipes?

Although the textual analyses of Part 1 identified adaptations made to suit local conditions and the introduction of eastern pharmaceutical knowledge, the continued significance of classical and late antique medical traditions in the Carolingian period, both as texts themselves and as sources for blended texts, such as MMCs, cannot be downplayed.[5] The presence of classical knowledge is important to consider since the 'healthscape' of Mediterranean antiquity was not the same as that of early medieval Europe. Not only is it likely that diseases would have differed to some degree, but so too would individuals' experience of disease. As Faith Wallis explains, experiences of health, wellness, and disease are culturally conditioned: 'what human beings – medieval or modern – see in the human body, or in the patterns of disease, is shaped

[4] Flint, 'The Early Medieval 'Medicus', the Saint—and the Enchanter', pp. 127-45; Skinner, *Health and Medicine in Early Medieval Southern Italy* (see especially Chapter 5, pp. 79-107); Pilsworth, 'Could you just sign this for me John?, pp. 363-88.

[5] Again, see the discussion of this topic in Chapters 1 and 2.

not only by the possibilities and limitations of their experience, but by the structures and meanings that their culture bestows on this experience.'[6]

The 'possibilities of experience' that every individual encounters are influenced by external forces, including a region's climate and endemic pathogens, as well as internal factors, such as lifestyle, working conditions, hygiene practices, systems of belief, and other socio-cultural features. When addressing crusader medicine, Piers Mitchell considers a similar geographic shift, that of crusaders migrating to the Middle East, and highlights potential differences in the health experiences of the two regions: 'an individual with a culture and an immune system developed for cooler northern Europe might have been at considerable risk…He would encounter new diseases to which he might have little immunity, such as the parasites dracunculiasis and schistosomiasis.'[7] While the situation Mitchell describes presents the inverse of the present study (Mitchell considers the movement of *people* between different regions rather than the redeployment of *knowledge* in a different time and space), it remains instructive. Most importantly, Mitchell explains that the crusaders' place of origin, northwest Europe (roughly paralleling the territory of the Frankish Empire), and their destination, the eastern Mediterranean (corresponding to the area where many classical and late antique medical authors were active), would have had major biological and cultural differences. Relating this to the current study, the medical knowledge recorded in the classical Mediterranean world would have developed to treat the needs of the people living in this region. As a result, some of the medical issues described by classical authors may have been less relevant to Carolingian scribes in cooler, damper environments.

Despite the potentially stark differences that Mitchell describes, it must be remembered that changes to the external forces that shape an individual's healthscape tend to accumulate gradually. Furthermore, this study contains a number of areas of overlap, such as the Italian peninsula. With this in mind, the health experiences of

[6] Wallis, *Medieval Medicine*, pp. xxv-xxvii.
[7] Mitchell, Medicine in the Crusades, p. 1.

physicians writing in antiquity and of early medieval scribes compiling collections of remedies in the eighth and ninth centuries should be viewed along a spectrum. Consider, for example, the climate and living conditions encountered by a monk in St Gall, a courtier at Aachen, or a scribe in Montecassino. The external forces acting on the latter individual may have been fairly similar to those experienced by Pliny, Dioscorides, and Galen.

On the other hand, there are certain conditions that were likely to afflict medieval monks just as they did classical physicians, such as toothache and joint pain. But did they? An individual's health is intrinsically related to social and environmental factors such as diet, lifestyle, and living conditions, so even seemingly universal conditions must be examined without preconceptions. Indeed, the examples of toothache and joint disease will be addressed in Chapters 7 and 8, respectively.

2. Working with the available evidence

The available evidence was an additional consideration that contributed to the selection of 'applicability' as an entry point into investigating the relationship between medical knowledge and practice. While Mitchell's work on medicine in the crusades has provided evidence for the practice of medicine during this period based on medical information recorded in surgical texts and chronicles, the early medieval written record is lacking such testimony. In later periods, medical treatments are discussed in a wider range of sources. Chroniclers, for example, often document conditions in camps, episodes of disease, and even some specific medical cases, ranging from trauma (such as injuries sustained while fighting, hunting, or horseback-riding) and infectious disease (including the famous case of Baldwin IV's leprosy) to vitamin and mineral deficiencies (such as scurvy).[8] Although these writings were not intended as case reports in the modern sense, medical professionals such as Mitchell can analyse their

[8] P. D. Mitchell, 'An Evaluation of the Leprosy of King Baldwin IV of Jerusalem in the Context of the Mediaeval World' in B. Hamilton (ed.), *The Leper King and his Heirs: Baldwin IV and the Crusader Kingdom of Jerusalem* (Cambridge, 2000), 245-58; Mitchell, *Medicine in the Crusades*, pp. 185-6, 188-90.

descriptions and assess whether useful medical information has been recorded. In some cases, chronicles and histories have provided pathognomonic details or have constructed a sufficiently clear overall picture of a condition for a modern medical diagnosis; this is, however, fairly rare, and the issue of retrospective diagnosis will be discussed below. Evidence from legal texts, such as penalties for malpractice, also provides insights into the types of procedures that were undertaken during this period. In contrast, comparable textual sources for the early medieval period, such as annals and law codes, provide little medical information (though I shall highlight a handful of examples in Chapter 9).

Secondly, while early medieval medical texts primarily focused on dietary and pharmaceutical treatments (with the exception of treatises on bloodletting), many later texts concentrate on surgery. Again, Mitchell's research on crusade medicine provides a useful comparison: he writes that 'sometimes the wording of a medical text uses practical examples that give the impression that it was written primarily to be used to treat the injured and at other times the inclusion of new techniques suggests that they were practised by the author who recommended their use.'[9] Such detailed first-hand accounts, especially for surgical procedures, are unknown in Carolingian medical writings; instead, the vast majority of references to use, such as the case of Terenti(an)us, appear to be part of stock phrases (though it must be noted that similar phrases can likewise be found in later writings).

Mitchell has also effectively demonstrated how to integrate textual and archaeological evidence, studying skeletal remains as well as excavations of hospitals, latrines, and other sites that may produce information regarding health and medicine. While some surgeries only concern soft tissue, others affect the skeleton and would therefore leave indications of surgical intervention, such as cut marks, in an individual's remains. Skeletal evidence and surgical tools found in excavations can then be compared to the surgical texts to assess whether particular treatments were put into practice. The lack of early medieval surgical writings combined with the lack of

[9] Mitchell, Medicine in the Crusades, p. 138.

medical equipment, such as surgical tools or pharmacy jars, among the material remains found in early medieval sites makes this type of comparison impossible for the Carolingian period.[10]

However, Mitchell also advocates for more general palaeopathological analyses of human remains when studying past medical practices since skeletal evidence 'can provide clear proof for weapon injuries and many diseases leave their mark on bone', offering many insights into individuals' health and experiences of disease and injury.[11] Crucially, unlike the evidence reviewed above, the potential for examining palaeopathological studies *does* exist for the early middle ages.[12] Therefore, this investigation into the applicability of the medical knowledge circulating in the Carolingian period is grounded on using skeletal evidence from early medieval sites to inform our reading of the recipe literature.

Palaeopathology, though technically defined as the study of disease in the past, is often based on the examination of the skeletal record.[13] Bones and teeth react to various stresses and age-related processes, including infection, injury, surgery, and repeated use, and in some cases these changes leave indicators on the skeleton. An evaluation of an individual's remains can also reveal information regarding their health and living conditions at various stages of their life: teeth, generally formed in infancy and childhood, provide information on an individual's early years whereas bone, which continues to remodel throughout life, can offer insights into the final decades of an individual's life.[14] Palaeopathological reports from excavations with early medieval

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[10] In contrast, excavations at a number of later medieval sites, such as the monastic hospital of Skriðuklaustur, have uncovered a variety of medical tools, including lancets and scalpels: S. Kristjánsdóttir, 'The Tip of the Iceberg: The Material of Skriðuklaustur Monastery and Hospital', *Norwegian Archaeological Review* 43 (2010), 44-62, p. 52.
[11] Mitchell, Medicine in the Crusades, p. 10.
[12] Fleming, 'Bones for Historians', pp. 29-48; Fleming, 'Writing Biography at the Edge of History', pp. 606-14.
[13] C. A. Roberts, *Human Remains in Archaeology: A Handbook* (Cambridge, 2012), p. 6; P. D. Mitchell, 'Retrospective Diagnosis and the Use of Historical Texts for Investigating Disease in the Past', *International Journal of Paleopathology*, 1 (2011), 81-8, p. 81.
[14] D. J. Ortner, 'What Skeletons Tell Us: The Story of Human Paleopathology', *Virchows Archiv*, 459 (2011), 247-54, p. 247.

remains therefore represent an ideal way to assess the applicability of the medical knowledge in circulation: does the osteological record preserve evidence of the conditions described in the texts? Would the treatments listed in MMCs have been sought by individuals in early medieval Europe?

In the three following case study-based chapters, I shall review osteological evidence from excavations of early medieval sites around the Carolingian world. As explained below, there are a number of challenges that must be considered when using the skeletal record to re-evaluate the manuscript evidence. Many of these challenges, however, are not insurmountable obstacles, but have, in fact, provided helpful parameters for framing my approach. In the following section I shall address intrinsic issues with archaeological evidence, such as excavation biases, and theoretical challenges related to the integration of skeletal evidence, such as retrospective diagnosis.

The challenges of using osteological evidence to inform textual analysis[15]

1. Intrinsic issues with archaeological evidence

a) *Underlying limitations*

The first challenges that must be considered concern the underlying organisation of archaeological research, such as the determination of where an excavation will occur, its scope, and its duration. In academic research archaeology, excavation size and timing may be dictated by funding, resources, and the seasonal limitations of fieldwork scheduled around academic calendars. Emergency or rescue archaeology that occurs as a result of construction and development may be more influenced by the requirements and urgency of the building project in question. In recent decades, the number of emergency excavations (especially of cemeteries) has grown, a by-product of roadworks, land development, and the redevelopment of urban

[15] This review of challenges will focus on those specific to my use of the osteological evidence, such as the location of excavations and the relative lack of publications. For more information on the physical challenges of studying human remains, such as the impact of disposal and decay on skeletal material or the effect of excavation and conservation on its preservation, see Roberts, *Human Remains in Archaeology*.

spaces.[16] While this has greatly increased the number of excavated cemetery sites, these projects are, necessarily, carried out under pressure, limiting their size, timing, and, in terms of analysing skeletal material, level of detail.[17] Although the constraints felt in research archaeology, such as limited funding or fieldwork seasons, may stem from different origins, they often produce similar results. It must be remembered that these fundamental restrictions, combined with the potential constraints caused by existing structures, often result in only partial excavations of a larger site. Incomplete excavations of cemeteries may produce a sample of remains that is unrepresentative of the site as a whole.[18]

While the inherent nature of rescue archaeology determines where the excavations occur, research archaeology has more latitude in site selection. These types of excavations, however, may be biased towards elite sites, such as religious institutions, royal settlements, or urban centres, based on the research interests of the investigators, the research interests of the project's funding body, or simply because the location of these sites might be better known. While the individuals buried in these contexts may not have been privileged themselves, or may have experienced a variety of conditions throughout their life (consider, for example, some of the Carolingian ecclesiastical elite who, despite humble origins, became bishops and courtiers), excavations in these sites are not likely to represent an even distribution of society, instead producing a bias towards more privileged individuals. Similar biases are often at play in emergency archaeology since many of the excavated cemeteries are in urban contexts.[19] Given the elite environments in which the manuscripts containing medical texts were generally produced and housed, a bias towards elite sites is not a disadvantage. Indeed, excavations of monastic communities, such as Lorsch, are therefore particularly relevant to this study, as will be detailed below. It must be

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[16] J. Pearce, 'Beyond the Grave: Excavating the Dead in the Late Roman Provinces', in L. Lavan and M. Mulryan (eds), *Field Methods and Post-Excavation Techniques in Late Antique Archaeology* (Leiden, 2015), 441-82, p. 445.
[17] Pearce, 'Beyond the Grave', pp. 445, 461.
[18] Ibid, p. 444.
[19] Ibid, pp. 445-8.

remembered, however, that medical practice in these sites may have been available for their wider communities, including the *familia* who worked the lands, as well as visitors, such as *missi dominici* and pilgrims.[20] It is therefore useful that the osteological evidence does not exclusively represent elite sites and, moreover, that some of the elite sites, such as Lorsch, appear to contain multiple cemeteries, including separate burial areas for the monks, *familia*, and pilgrims.[21]

The geographic distribution of excavations, often linked to the interests of researchers or funding bodies, is another bias with which to contend. This is particularly noticeable in northern Italy, where large numbers of Lombard necropoli have been excavated due to the regional interest in Lombard migration and settlement.[22] This concentration on excavations in northern Italy is important to note since these projects include recent and well-documented excavations that have analysed and reported on skeletal remains (or at least more so than in other areas, though the number of publications is still limited and will be discussed in the following section). As a result, I have included many of these sites in the following chapters and will address their representativity in more detail below.

b) *The state of the field: Publications and standardisation*

Traditionally, there has been relatively little interest in analysing and recording skeletal remains in detail; research has instead concentrated on other aspects of burials, such as the analysis of grave goods and positioning of the skeleton.[23] In recent decades, however, there has been a significant increase in research on the human remains

[20] As noted in Chapter 2, the level of medical practice available within and beyond monastic centres continues to be debated. See, for example, Glaze, 'The perforated wall', pp. 13-14, 69-79; Horden, 'What's Wrong with Early Medieval Medicine?', pp. 8, 10-13, and 16; Nutton, 'Early Medieval Medicine and Natural Science', p. 326; Park, 'Medicine and Society in Medieval Europe, 500-1500', pp. 65-6.

[21] Personal communications with members of the scientific board of Lorsch, including Claus Kropp and Hermann Schefers.

[22] A. Chavarría and M. Marinato, 'Frammentazione e complessità nelle practiche funerarie altomedievali in Italia settentrionale', in P. Arthur and M. L. Imperiale (eds), *VII congresso nazionale di archeologia medievale*, 2 vols (Florence, 2017), II, 61-8.

[23] Roberts, Human Remains in Archaeology, pp. 11, 40.

themselves, coinciding with the development of new techniques and methodologies, such as stable isotope analysis, that are producing alternative approaches to the study of the skeletal record.[24] Although this type of work is increasing, there are still many excavations (or at least published excavation reports) that do not analyse the skeletal remains in detail. Consider, for example, the 2017 publication of excavations at the Saint-Servatius complex in Maastricht.[25] While several burial areas were excavated, including a Carolingian cemetery, the extensive report provided barely any information on the skeletal material uncovered in the cemeteries, instead concentrating on grave goods, burial positioning, and other features. This case is particularly frustrating for the present study since sixty adults have been identified in the Carolingian cemetery: the chapter discussing these burials provides information on basic demographic data but offers no comments on palaeopathology.[26] It must be noted, however, that the original excavations date to 1969 and 1970, so it is possible that more detailed skeletal analyses were not conducted at this time and therefore could not be incorporated in the present volume.

A single example does not capture the extent of this issue and it helps to consider the lack of publications on a larger scale. Recent work on Dorestad provided a review of regional burial practices and noted that although cemeteries from the late Merovingian and early Carolingian period 'have been discovered in numerous places, there has never been a thorough investigation' of these sites and the skeletal remains contained within them.[27] The continuation of cremation in the Rhineland into the eighth and, in some cases, even the ninth centuries presents a further complication

[24] Fleming, 'Writing Biography at the Edge of History', pp. 611-13.
[25] F. C. W. J. Theuws and M. Kars (eds), The Saint-Servatius complex in Maastricht: The Vrijthof excavations (1969-1970): Roman Infrastructure - Merovingian Cemetery - Carolingian Cemetery - Early Town Development (Bonn, 2017).
[26] F. C. W. J. Theuws and M. Kars, 'The Carolingian Cemetery 5', in F. C. W. J. Theuws and M. Kars (eds), The Saint-Servatius complex in Maastricht: The Vrijthof excavations (1969-1970): Roman Infrastructure - Merovingian Cemetery - Carolingian Cemetery - Early Town Development (Bonn, 2017), 354-63.
[27] W. A. van Es and W. J. H. Verwers, *Excavations at Dorestad 4: The Settlement on the River Bank Area* (Amersfoort, 2015), see especially pp. 215-236.

when attempting to analyse skeletal remains.[28] A 2017 article by Alexandra Chavarría Arnau and Maurizio Marinato reviewed the state of early medieval funerary archaeology in northern Italy, specifically highlighting the lack of publications concerning the skeletal remains found in excavations.[29] They recorded 1193 excavated early medieval cemeteries in northern Italy and found that only 143 of these excavations have published anthropological data. Moreover, the 143 publications range from very basic overviews of demographic data to extremely detailed analyses of each individual; the authors identified forty-nine sites with in-depth studies of skeletal material as well as good chronological reliability.[30] The vast majority of these reports are from recent excavations and publications, indicating that, although the total number of publications that consider skeletal material in detail remains fairly limited, it is growing.

Another potential problem to overcome, and one inherently linked to the low number of published reports, is the unevenness of existing publications. Many reports never reach publication, especially in the context of emergency archaeology, due to constraints of funding, timing, and resources, creating major gaps in the literature.[31] On the other hand, when reports are published, they are rarely comprehensive records; as John Pearce notes, 'many significant projects are published only in highly summarised or selective form, and information from them is otherwise only available in archive or as 'grey literature', the unpublished interim reports created following fieldwork.'[32] Although the black hole of grey literature remains a major issue in the field, the publication of summarised and selective reports is less of a setback for the

[28] van Es and Verwers, *Excavations at Dorestad 4*, p. 227: 'in Groningen and further eastwards [cremation] continues until after 800.' For more on early Frankish burial practices, see the work of Guy Halsall, such as G. Halsall, *Cemeteries and Society in Merovingian Gaul: Selected Studies in History and Archaeology, 1992-2009* (Leiden, 2009) and G. Halsall, *Settlement and Social Organization: The Merovingian Region of Metz* (Cambridge, 2002).
[29] Chavarría and Marinato, 'Frammentazione e complessità nelle practiche funerarie altomedievali in Italia settentrionale', pp. 61-8.
[30] Ibid.
[31] Roberts, Human Remains in Archaeology, p. 11.
[32] Pearce, 'Beyond the Grave', p. 469.

present study: summary reports that highlight the presence of key pathologies, present a general survey of the dentition, and/or review the overall state of health and disease in the skeletal assemblage provide sufficient information since I am using the osteological evidence to help enrich our understanding of the texts, rather than pursuing analyses of this material itself. In other words, my investigation does not rely on reading a detailed analysis of each individual, let alone each bone or tooth, recovered from a site. Taking dental pathologies as an example, a summary report that provides an overview of the population's dentition, noting, for example, the percentage of individuals affected by cavities, the frequency and severity of dental calculus build-up, and the presence of pathological lesions, offers enough detail to compare to the recipe literature's description of dental problems; an in-depth analysis of each individual's dental remains is not necessary for these purposes.

The lack of standardisation within the field presents a related issue.[33] While approaches are becoming increasingly standardised, this has been a major challenge to comparative analyses of multiple sites, especially on an international level. In particular, documentation practices as well as the methods and criteria used for analysing skeletal material may vary between sites. This variability, however, poses less of a problem in the present study for reasons similar to those outlined above. Again, using dental pathologies as an example, subtle differences in how the degree and location of a carious lesion is recorded will have relatively little impact on this research.

2. Theoretical challenges related to the integration of skeletal evidence

a) *Retrospective diagnosis*

Retrospective diagnosis, the identification of 'an individual case of illness or a disease in history by a modern name or diagnostic category', presents one of the thorniest conceptual challenges within this project.[34] Retrospective diagnoses can be

[33] Roberts, *Human Remains in Archaeology*, pp. 12, 103-51.
[34] A. Karenberg, 'Retrospective Diagnosis: Use and Abuse in Medical Historiography', *Prague Medical Report* 110 (2009), 140-5, p. 140.

highly problematic for a wide variety of reasons. In particular, there are extensive debates regarding the potential utility of retrospective diagnosis (what do we gain from applying a modern medical diagnosis to a past disease experience?), its accuracy (if modern medicine sometimes makes errors in diagnosis, what is the likelihood of correctly diagnosing individuals in the past?), appropriateness from an intellectual standpoint (*can* we apply a modern diagnosis given the cultural and environmental differences between the diagnosing physician and diagnosed individual?), and potential ethical problems (have the individuals in question given consent?). The following section will review the debates involving retrospective diagnosis, the responses to these issues, and how this dissertation fits into the discussion.

In many cases, retrospective diagnoses have been pursued by physicians interested in the health of a famous individual. Studies of this kind, sometimes labelled 'anachronistic diagnoses', are often criticised for their modern medical approach to an historical question combined with their less rigorous study of the appropriate historical evidence.[35] Axel Karenberg, a physician-turned-historian, explains that retrospective diagnosis 'runs the risk of restricting the understanding of history to a biologic process'; this is particularly true if the cases are not adequately contextualised within their historical period.[36] Osamu Muramoto expands on these concerns, noting that retrospective diagnoses rarely address 'the possibility that different diseases might have existed in historical time, or [that] the same disease might have been described through different illness experiences that are bound by a particular historical time and place.'[37] This begs the question: is retrospective diagnosis useful? Furthermore, does applying a modern medical label on a past disease experience make sense? Andrew Cunningham takes a hard-line against retrospective diagnosis, arguing that it is neither legitimate nor possible to diagnose diseases from historical evidence given the

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[35] O. Muramoto, 'Retrospective Diagnosis of a Famous Historical Figure: Ontological, Epistemic, and Ethical Considerations', *Philosophy, Ethics, and Humanities in Medicine* 9 (2014), doi: 10.1186/1747-5341-9-10.
[36] Karenberg, 'Retrospective Diagnosis', pp. 144-5.
[37] Muramoto, 'Retrospective Diagnosis of a Famous Historical Figure', doi: 10.1186/1747-5341-9-10.

differences between past experiences and understandings of disease and our own.[38] Instead, he suggests that past disease, as experienced and identified by the people who were affected by it, should be understood in the past as exclusively historical studies without the introduction of modern medical concepts.[39] Mitchell and Muramoto, despite agreeing with aspects of Cunningham's argument, have shown how retrospective diagnosis can provide valuable insights into understanding past populations. More specifically, Muramoto has advanced an effective counter argument from a theoretical perspective while Mitchell has offered constructive guidance on the best practices for incorporating textual evidence in the study of past disease.[40]

Muramoto offers a systematic analysis of the conceptual critiques of retrospective diagnosis, simultaneously outlining a thoughtful defence. Beginning with the ontological challenge presented by making a diagnosis in the past, he uses the example of tuberculosis, or specifically a *Mycobacterium tuberculosis* infection. Many retrospective diagnoses are interested in asking 'whether Disease X which we recognise as tuberculosis today is the same and identical disease as "phthisis", "consumption", or whatever they called [it] in historical time.'[41] This, he argues, is not an appropriate way to investigate a past disease because it does not account for changing environmental, biological, and cultural differences. Instead, he suggests framing the investigation by questioning the ontology of a disease, its persistence and existence through time: 'consider modern tuberculosis representing Disease X, while historical tuberculosis Disease X^1. Diseases X and X^1 may be related to each other, but they are not identical, or may be clinically similar but may be different entities with different aetiology and pathophysiology.'[42] Accepting both the difference *and*

[38] A. Cunningham, 'Identifying Disease in the Past: Cutting the Gordian Knot', *Asclepio* 54 (2002), 13-34.
[39] Cunningham, 'Identifying Disease in the Past', 16.
[40] Muramoto, 'Retrospective Diagnosis of a Famous Historical Figure', doi: 10.1186/1747-5341-9-10; P. D. Mitchell, 'Improving the Use of Historical Written Sources in Paleopathology', *International Journal of Paleopathology* 19 (2017), 88-95.
[41] Muramoto, 'Retrospective Diagnosis of a Famous Historical Figure', doi: 10.1186/1747-5341-9-10.
[42] Ibid.

similarity or relatability between Diseases X and X^1 is crucial to the present dissertation. Continuing with the tuberculosis example, although in a modern medical setting tuberculosis is understood to be caused by *Mycobacterium tuberculosis*, historical tuberculosis ('consumption', 'phthisis', etc.) may have been caused by other pathogens (such as *Mycobacterium bovis*) that produced a similar result.

Given the underlying questions of this project, thinking about a range of related or similar diseases is more fitting: when considering the potential applicability of medical remedies, I am interested in the symptoms that diseases produced rather than a specific disease label. Although tuberculosis is not one of the selected conditions addressed in the following chapters, it provides a useful example. It would be inappropriate to take the medieval Latin medical term *phthisis*, what is commonly translated as 'consumption' or 'tuberculosis', to mean an infection of *Mycobacterium tuberculosis* and look for skeletal indicators of this particular disease. Instead, I would read *phthisis* as a collection of symptoms that loosely correspond to diseases like tuberculosis, such as coughing and weight loss. With this group of symptoms in mind, I would then consider the possible ways these might leave skeletal indicators (or the types of diseases that could be linked to these symptoms that also leave skeletal indicators). While the relationship between *phthisis*, tuberculosis, and other diseases is too complex to investigate in this dissertation, my study takes a careful and approximate approach to a number of other conditions.

Although retrospective diagnosis continues to be debated, this type of non-specific, conservative approach is generally accepted by many historians of medicine. Faith Wallis, for example, writes, 'it can sometimes be useful for the purposes of historical analysis to try to determine what modern disease category might match a medieval description; indeed, it can actually enhance our understanding of what the medieval writer is attempting to convey.'[43] This fits with what the following chapters attempt to do: by thinking about the 'disease categories' suggested by the texts with respect to the osteological evidence, we can re-evaluate whether the texts might have

[43] Wallis, *Medieval Medicine*, p. xxvii.

been applicable—that is, recording treatments for conditions that, based on skeletal remains, we know individuals experienced in this period.

Returning to Muramoto's in-depth examination of retrospective diagnosis, he also takes issue with one of the standard approaches to the question 'how do we know what disease a person had?' Many of the opponents of retrospective diagnosis point out that modern researchers can never know the full medical 'reality' of an individual in the past since historical evidence, whether textual, art historical, or archaeological, does not represent medical data, or at least not the type of medical data recorded today for the purpose of diagnosis. However, Muramoto reminds us that, fundamentally, 'medical diagnosis is a process of hypothesis-making and hypothesis-adjustment' as well as 'a probabilistic judgment under uncertainty rather than an apodictic judgement under certainty.'[44] If modern diagnoses are not given with complete certainty, then retrospective diagnoses should not be held to a higher, impossible standard. Additionally, Muramoto explains that 'a clinician is not a natural scientist whose task is to uncover a hidden state of affairs of nature; she is only applying natural sciences to more pragmatic tasks of caring and treating a sick patient, explaining the condition, and prognosticating the future course of his suffering.'[45] Understanding diagnosis as an explanatory device is critical to the present study: diagnosis is less about defining a patient's exact, certain, and total disease reality, and instead concerned with determining the next course of action and possible long term expectations. This can be easy to forget since modern medical diagnoses involving advanced laboratory tests and imaging are often seen as a definition of an individual's condition rather than an explanatory device based on probability and subject to revision. Understanding that diagnosis, whether modern or medieval, is intended to provide a framework for treatment and care directly connects to the textual evidence under consideration.[46]

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[44] Muramoto, 'Retrospective Diagnosis of a Famous Historical Figure', doi: 10.1186/1747-5341-9-10.
[45] Ibid.
[46] This take on diagnosis also aligns more closely to the early medieval focus on prognostication. See Wallis, 'Signs and Senses', pp. 265-78.

Muramoto tackles one final epistemological point: the methodologies involved in diagnosis. Modern medicine can diagnose conditions from a number of different approaches, 'by clinical signs and symptoms (clinical diagnosis); by laboratory tests (laboratory diagnosis); by genetic tests (genetic diagnosis); by identifying aetiology (aetiological diagnosis); [and] by pathological examination (pathological diagnosis).'[47] Although the use of skeletal remains makes possible the examination of pathologies and even some medical tests, many of the above methods are not available when making diagnoses in the past, adding a further degree of uncertainty. An assessment of the evidence should therefore take these methodological limitations into account, framing the possible diagnosis cautiously, such as 'X and Y symptoms or markers are consistent with Z disease.'[48] Mitchell similarly advocates a cautious approach to the identification of past disease and suggests using phrases such as 'possible example of', 'is compatible with', 'a probable example of', or 'very likely to represent' Disease X.[49]

Finally, with this theoretical framework in mind, the question of medical ethics must be addressed. Since I am not pursuing an investigation of a particular individual but rather general trends and patterns in the palaeopathological data regarding a selection of conditions, many of the ethical concerns with retrospective diagnosis pose less of an issue. First, the selected conditions, such as joint disease and oral pathologies, are not diseases that could damage someone's reputation posthumously (i.e., reveal information that someone would want to conceal), and secondly, given the nature of the sample, the individuals are anonymous and not linked to any living people.

[47] Muramoto, 'Retrospective Diagnosis of a Famous Historical Figure', doi: 10.1186/1747-5341-9-10.
[48] Ibid.
[49] Mitchell, 'Improving the Use of Historical Written Sources in Paleopathology', p. 89.

b) *The osteological paradox*

In 1992, James Wood, George Milner, Henry Harpending, and Kenneth Weiss presented the osteological paradox, a series of conceptual challenges that have had a significant impact on the study of palaeopathology.[50] While elements of their landmark report have been debated and revised, the points they originally outlined remain essential to consider when analysing the skeletal record in relation to health and disease in the past.[51] They highlighted three major problems: demographic nonstationarity (populations are not stationary but in a constant state of flux), selective mortality (a skeletal sample is inherently biased because it only represents the dead *and* only represents them at their age of death), and hidden heterogeneity in risks (an individual's 'underlying frailty or susceptibility to disease and death' is unknown).[52] The combination of these problems results in the paradox that the skeletal remains with evidence of pathologies may actually represent the healthier individuals of the population. To clarify, those individuals with signs of 'disease X' lived long enough with disease X for signs of its presence to be recorded in their bones. Individuals from the same burial group without indicators of disease X may have also suffered from disease X but died before it could be recorded in their skeleton. In other words, individuals who appear healthy based on an assessment of their skeletal remains may actually have been frailer than those with evidence of disease.

However, since the underlying questions of this dissertation concern the potential practice of medicine in relation to the medical knowledge in circulation, the problems raised by the osteological paradox are somewhat secondary issues. The evidence of early medieval health and disease as preserved in the skeletal record is,

[50] J. W. Wood, G. R. Milner, H. C. Harpending, and K. M. Weiss, 'The Osteological Paradox', *Current Anthropology* 33 (1992), 343-70.
[51] Consider, for example, the twelve pages of responses to the original article (Wood, Milner, Harpending, and Weiss, 'The Osteological Paradox', pp. 358-70) and later responses such as M. N. Cohen, J. W. Wood, and G. R. Milner, 'The Osteological Paradox Reconsidered', *Current Anthropology* 35 (1994), 629-37; S. N. DeWitte and C. M. Stojanowski, 'The Osteological Paradox 20 Years Later: Past Perspectives, Future Directions', *Journal of Archaeological Research* 23 (2015), 397-450.
[52] Wood, Milner, Harpending, and Weiss, 'The Osteological Paradox', pp. 344-5.

naturally, central to this research (which is why the osteological paradox remains an important collection of concepts with which to engage), but the range of conditions that I am investigating (elaborated below) are less affected by these particular problems. Consider, for example, traumatic lesions: whether a person was more or less susceptible to disease would likely have had a relatively low impact on their exposure to trauma, such as accidental falls. While their underlying health could have affected their recovery from such an injury, the skeletal evidence of the initial traumatic incident would be unchanged. Regarding oral pathologies and joint diseases, the conditions in which I am interested are unlikely to result in death, or at least not immediately. This is in contrast to many diseases that could have killed an individual before skeletal changes occurred. Consequently, the osteological paradox provides a useful framework when studying the skeletal record but should present less of a challenge to this dissertation.

c) *Selection of conditions*

Palaeopathological evidence for disease, injury, and treatment is grounded in what can be seen on an individual's remains. Not all medical conditions, however, leave marks on the skeleton, an issue that presents a major limitation when working with this type of evidence. My comparison of textual and skeletal evidence, therefore, is necessarily restricted to conditions that have the potential to be recorded in teeth and bones. Consequently, there are many medical issues that, though they are mentioned by medical texts, will not be investigated in this dissertation, including conditions affecting soft tissues (such as stomach aches, liver and spleen pain, and eye problems), external areas (such as hair loss and skin diseases), and mental health. There are, of course, some exceptions. A limited number of conditions affecting soft tissues may be revealed through palaeopathological analysis, but they are often challenging to identify and can go unnoticed fairly easily.[53] In the case of cardiovascular disease, for example, abnormal, enlarged blood vessels may leave an impression of their expansion in certain

[53] T. Waldron, *Palaeopathology* (Cambridge, 2009), pp. 224-35.

areas of the skeleton, especially around the heart.[54] Mummified remains present another exception because soft tissues may be preserved and analysed; the archaeological material involved in this project, however, does not contain remains preserved in this manner.[55] Given the challenges of identifying soft tissue conditions in skeletal assemblages and lack of suitable remains, soft tissue diseases have not been considered in the present study.

Similarly, some conditions that may at first seem impossible to leave traces in the skeletal evidence could ultimately be related to pathologies recorded in the skeleton; consider, for example, head pain or vision changes due to an osteoma, a type of benign tumour that can be found in the skull and frontal sinus.[56] It would be impossible, however, to compare these (and other) symptoms of an osteoma to the skeletal evidence for osteomas given all the possible causes of head pain and vision changes.

Despite the constraints outlined above, many conditions can be more straightforwardly studied through palaeopathological analyses of human remains. Primary research areas include joint diseases, infectious diseases, metabolic diseases, trauma, disorders of growth and development, dental diseases, and certain cancers.[57] The following chapters focus on three of these categories: dental diseases (Chapter 7), joint diseases (Chapter 8), and surgery and trauma (Chapter 9). This selection was influenced by my detailed analysis of the recipe literature: having a thorough understanding of the types of conditions and symptoms that the medical texts claim to treat made possible a more targeted study of particular conditions. My consideration of the practicality of the recipes laid the groundwork for the following investigation into their applicability.

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[54] Waldron, *Palaeopathology*, p. 224.
[55] M. R. Zimmerman, 'The Analysis and Interpretation of Mummified Remains', in A. L. Grauer (ed.), *A Companion to Paleopathology* (Chichester, 2012), 152-69; Waldron, *Palaeopathology*, pp. 221-3.
[56] Waldron, *Palaeopathology*, pp. 170-2.
[57] A. C. Aufderheide and C. Rodríguez-Martín, *The Cambridge Encyclopedia of Human Paleopathology* (Cambridge, 1998); A. L. Grauer (ed.), *A Companion to Paleopathology* (Chichester, 2012); Waldron, *Palaeopathology*.

d) *Absence of evidence as evidence of absence?*

A final theoretical challenge to consider is the potential absence of osteological evidence for conditions recorded in the texts. If symptoms relating to 'Disease X' are described in the recipes but unidentified in skeletal remains, does this indicate that the texts were, at least with respect to this disease, irrelevant to early medieval populations? While such a case could suggest that the recorded treatments preserved information that was not applicable to communities in Carolingian Europe, the absence of osteological evidence must not be interpreted as simply the evidence of absence. There are many reasons why a condition that *could* be preserved in skeletal material has not been identified (or recorded), including a number of the challenges highlighted above, such as the lack of publications, the potentially incomplete nature of excavations, the skeletal material's state of preservation, and the variation in the degree to which skeletal remains are analysed and recorded. Therefore, this dissertation is most concerned with the positive evidence, that is, the cases where the osteological evidence parallels the treatments recorded in the texts, as this correlation indicates that the medical knowledge in question could have been used in the practice of medicine. In cases where osteological evidence is lacking, I shall consider the wider context to see if it can provide any further insights—though the absence of skeletal indicators for a particular condition cannot be read as proof that it was not present. This will be particularly important to keep in mind in Chapter 8 with respect to the question of gout. In this example, I argue that the wider context helps to clarify the situation.

Outlining the analytical framework of Chapters 7-9

Having now delineated the foci of Chapters 7-9, this final section shall review the archaeological sites involved and introduce the spectrum of specificity, a key element of my re-evaluation of the recipe literature.

1. OVERVIEW OF SITES

The osteological evidence consulted in the following chapters comes from excavations of early medieval sites found across the Carolingian world, representing communities from both the Frankish heartlands as well as more peripheral areas. In total, Chapters 7-9 have considered reports on skeletal material from twenty-one different excavations located within the Carolingian Empire; for comparative work, references are also made to skeletal evidence from contemporary sites in the British Isles (Chapters 8 and 9) as well as excavations of early Frankish burials (Chapter 9).[58] The chronological and geographical spread of these sites must be considered with respect to their representativity, especially given the inclusion of a number of excavations located in northern Italy.

Questions of chronology, regarding both dating accuracy and the length of time a site was used, present potential challenges when comparing the osteological remains to manuscript evidence. In many cases, the dates of occupation and/or use of a burial area are only known with relative precision based on stratigraphic evidence or material remains.[59] Occasionally, more precise dating methods, such as radiocarbon dating, are used on osteological remains, providing a date within the range of two to three generations. Unfortunately, this method of dating is destructive and very expensive and therefore only rarely employed to date skeletal evidence. As a result, many of the dates for early medieval skeletal assemblages must be interpreted as approximate rather than absolute. However, as noted above, the external and internal factors

[58] The twenty-one sites are: Acqui Termi, Corso Roma; Biel-Matt; Bolgare; Campione d'Italia; Cherbourg; Cremona piazza Marconi; Kirchheim/Ries; Lorsch; Maastricht; Mannheim-Seckenheim; Neresheim; Nusplingen; Rivoli la Perosa; San Lorenzo di Desenzano; San Cassiano; San Lorenzo di Quingentole; San Martino d'Ovaro; Santa Maria Assunta di Cairate; Sant'Agostino; San Vito di Illegio; and Schretzheim.

[59] Rarely, the existence of complementary documentary evidence can provide a more precise date for site occupation or burial; the excavation of Abbot Talaricus' tomb at San Vincenzo al Volturno presents one such example. This site, however, will not be considered in the present study given its southern location. R. Hodges, J. Mitchell, and L. Watson, 'The discovery of Abbot Talaricus' (817–3 October 823) tomb at San Vincenzo al Volturno', *Antiquity* 71 (1997), 453-6.

affecting health and disease, such as environment and culture, tend to change gradually, thereby allowing for some flexibility with respect to dating.

The duration with which a site was used also deserves mention since many sites were used over a relatively long period of time, often spanning several centuries, and may have been used for multiple purposes (settlement, cemetery, quarry, disposal area, etc.) over this period, complicating the establishment of a firm chronology.[60] As a result, many of the reports consulted in the following chapters concern sites that cannot be dated to the eighth and ninth centuries exclusively. While these sites were used during the Carolingian period, they generally pre- and/or post-date it, too. This chronological breadth means that some skeletal material used in this dissertation does not perfectly align with the more precisely and narrowly dated textual record. Yet, again, as noted above, the generally gradual nature of environmental changes that affect population health provide for some flexibility regarding the chronology: cemeteries that contain remains pre- or post-dating the Carolingian period by a few generations should, in the majority of cases, still be comparable and relevant to this study.

The Abbey of Lorsch offers a useful example with respect to the uncertainty of dating. Although the cemetery areas may contain burials spanning the entire period in which the monastery was active, radiocarbon dating has provided definite evidence of Carolingian burials within the so-called *Mönchsfriedhof*, the cemetery that is thought to have contained the monks.[61] Given this cemetery area's size and uniformity, it is not unlikely that the presently un-dated individuals may be dated to within a few generations of the Carolingian period, if not also dated to the Carolingian period. The Lorsch skeletal material, moreover, represents a particularly interesting reference point given its connections with medical texts in the late eighth and ninth centuries: surviving library catalogues indicate that its library housed several medical manuscripts during this period and its scriptorium produced the *Lorscher Arzneibuch*

[60] Pearce, 'Beyond the Grave', p. 467.
[61] Personal communications with members of the scientific board of Lorsch, including Claus Kropp and Hermann Schefers.

in *c*. 800.[62] As this codex contains recipe collections comparable to many of the MMCs involved in this dissertation, it is essential to consider osteological evidence from Lorsch in relation to the treatments recorded in the texts.

While Lorsch, situated in the Rhineland, represents a site at the heart of the Frankish Empire, some of the skeletal material consulted in Part 2 comes from the fringes of the Carolingian world. In particular, there is a strong focus on sites from northern Italy. As highlighted above, regional interests in Lombard migration and settlement have resulted in extensive excavations of Lombard sites, and a number of recent studies in this area have produced extensive analyses of skeletal remains.[63] Given Charlemagne's conquest of the Lombard Kingdom in 774, I have used palaeopathological reports from northern Italy with a date range that extends into this period—while their period of use tends to pre-date (and in some cases also post-date) the eighth century, they do overlap with the period of Carolingian control of northern Italy. Furthermore, although the representativity of these sites may be questioned given their peripheral location, northern Italian skeletal remains present, like Lorsch, an especially relevant sample to study since a number of the manuscripts involved in this study were produced in northern Italian scriptoria. The movement of many of these codices to centres in the Alps and beyond, such as St Gall, Reichenau, and Fulda, speaks to the interconnectedness of these communities and a shared intellectual culture, thus indicating the importance of considering skeletal remains from both sides of the Alps.

[62] Bamberg, Staatsbibliothek, Msc. Med. 1; Stoll, Das Lorscher Arzneibuch; B. Bischoff, Die Abtei Lorsch im Spiegel ihrer Handschriften, 2nd edn (Lorsch, 1989); G. Keil and P. Schnitzer (eds), Das Lorscher Arzneibuch und die Frühmittelalterliche Medizin: Verhandlungen des Medizinhistorischen Symposiums im September 1989 in Lorsch (Lorsch, 1991).

[63] Chavarría and Marinato, 'Frammentazione e complessità nelle practiche funerarie altomedievali in Italia settentrionale', pp. 61-8.

2. THE SPECTRUM OF SPECIFICITY

Returning to the texts, it is essential to outline a central feature of my assessment of the recipes in light of the osteological record. As mentioned in Chapter 2, recipes vary enormously in their specificity: an antidote may claim to treat over fifty different conditions, while a simple may intend to heal a single ailment. This variety is important to bear in mind when considering the question of applicability as there is a difference between a reference to, for example, tooth pain in a very general antidote and a highly targeted remedy for toothache—in the former, tooth pain is one of many conditions, whereas it is the primary focus of the latter. These recipes represent the two ends of the spectrum of specificity regarding their approach to treatment, and I found that differentiating recipes based on this variable is a helpful way to identify patterns in the information they present (especially when combined with other categories, such as target area(s) of treatment) and assess how the textual evidence compares to the osteological record.

In the following chapters, I shall classify recipes as belonging to one of three levels of specificity: a) non-specific, b) semi-specific, and c) highly specific. Antidotes and other recipes that claim to treat a large variety of seemingly unrelated conditions, ranging from snake bites and fevers to stomach pains and gout, fall into the non-specific group; recipes that target a range of similar conditions are considered semi-specific; and recipes that intend to treat a single condition have been classified as highly specific. While the difference between these levels of specificity is subjective, their divisions become easier to see when presented with the recipe literature. Consider, for example, recipes that target joint pain: when joint pain is one of a host of conditions, the recipe is classified as non-specific, but when it is found alongside a limited number of other symptoms, such as dislocations and fractures, the recipe is considered semi-specific (all of the conditions the recipe intends to treat concern pain management). In contrast, a remedy that only targets joint pain, whether general arthritic pains or a named joint area, falls under the highly specific category. Given the particularly focused nature of highly specific treatments, the following case studies concentrate on this category of recipes in relation to the skeletal evidence.

Having reviewed the significance of the question of applicability and outlined my approach to re-evaluating the recipe literature, it is now possible to turn to the first case study, an investigation into the applicability of early medieval remedies for dental problems in light of the osteological evidence for oral pathologies.

Chapter 7
Dental Disease: From Caries to Cosmetics

A monk from Lorsch

***Figure 7.1**: A Carolingian monk (?) from Lorsch (C. Kropp, A.-K. Kirsch, W. Rosendahl, et al.,* Begraben und Vergessen? Knochen erzählen Geschichte: Anthropologische Ausstellung im Schaudepot Zehntscheune des UNESCO Welterbe Kloster Lorsch *(Bad Homburg v. d. Höhe, 2017))*

When considering health in the past, few sights are more compelling than a skull that shows clear signs of disease. Figure 7.1 offers one such encounter, presenting a skull with evidence of a variety of dental problems, including caries, deposits of dental calculus, periodontal disease, and dental enamel hypoplasia. Figures 7.2 and 7.3 provide a closer look at the state of this individual's dentition, highlighting carious lesions (pointed out by arrows in Figure 7.2), deposits of calculus (seen as the whitish-grey deposits on the surface of the teeth in Figure 7.3), and dental enamel hypoplasia (evidenced by the horizontal bands across the teeth in Figure 7.3). This individual, a male aged thirty-five to forty years old at the time of his death, was uncovered in excavations at Lorsch in 1999.[1] His burial was part of the *Mönchsfriedhof*, a cemetery within the Abbey complex that is thought to have been used primarily by the monastic community. Radiocarbon dating indicates that he lived

[1] C. Kropp, A.-K. Kirsch, W. Rosendahl, et al., Begraben und Vergessen? Knochen erzählen Geschichte: Anthropologische Ausstellung im Schaudepot Zehntscheune des UNESCO Welterbe Kloster Lorsch (Bad Homburg v. d. Höhe, 2017), pp. 38-9.

during the late Carolingian period.[2] What can we learn about early medieval dental health by studying this monk and other individuals from this period?

Teeth provide a wealth of information. The oral pathologies recorded in the Lorsch monk's dentition, for example, do not present a straightforward case of disease but can offer a much more nuanced picture of the state of his health, both at the time of his death and in earlier phases of his life. Unlike bones, which remodel throughout an individual's life, teeth can provide a snapshot of the period in which their growth occurred, generally infancy or childhood, while simultaneously recording later dietary and disease experiences. Thus, the presence of carious lesions and calculus point to poor dental hygiene as an adult and illustrate the state of his oral health at the time of his death. On the other hand, the existence of dental enamel hypoplasia reveals that he may have suffered from malnutrition or a

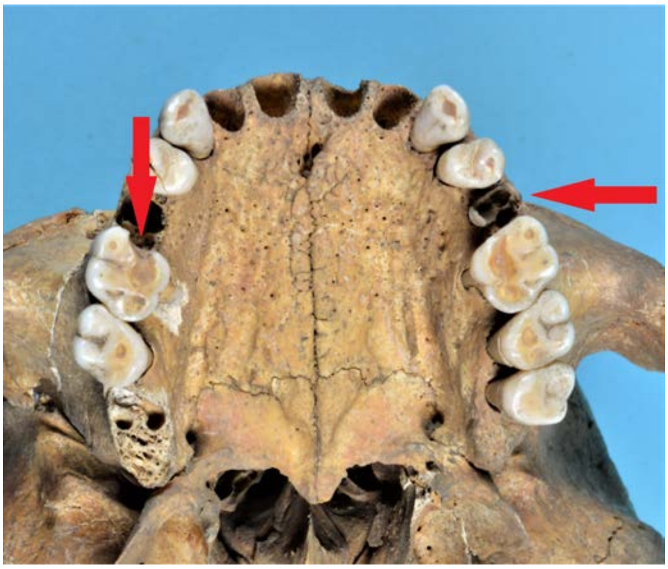

***Figure 7.2**: Carious lesions, a close-up of the individual from Figure 7.1 (Kropp, Kirsch, Rosendahl, et al.,* Begraben und Vergessen?*)*

***Figure 7.3**: Dental calculus and dental enamel hypoplasia, a close-up of the individual from Figure 7.1 (Kropp, Kirsch, Rosendahl, et al.,* Begraben und Vergessen?*)*

[2] The date range given by radiocarbon dating is 888-966. Kropp, Kirsch, Rosendahl, et al., *Begraben und Vergessen?*, pp. 38-9.

serious disease as an infant and/or young child, shedding light on his health over time.

In this chapter, I shall concentrate on dental disease, first reviewing evidence from early medieval skeletal remains and then analysing recipes that concern treatments for toothaches, lost teeth, mouth sores, and other aspects of oral health before considering the question of applicability. Overall, many of the symptoms listed in the texts appear to have a high degree of overlap with conditions seen in the osteological record: remedies for toothache, mouth sores, lost/loose teeth, putridity, and gum problems parallel pathologies observed in the skeletal remains in essentially all sites reviewed in this dissertation. I therefore argue that the treatments for dental problems recorded in the texts would have been highly applicable to many individuals in early medieval Europe. A consideration of several categories of recipes, such as treatments that target specific types of teeth, adds further weight to this argument.

Oral health in the skeletal evidence

Dental remains represent one of the best materials to study when investigating health and disease in the past, and not simply due to the range of information they can provide as noted above. Teeth tend to 'resist destruction and taphonomic conditions better than any other body tissue' due to their protective layer of enamel and are therefore relatively well preserved in the archaeological record.[3] Before examining the state of dental health as seen in early medieval skeletal assemblages, I shall briefly review dental anatomy, a number of common conditions, and several important methodological challenges that must be taken into consideration.

1. Dental disease in the archaeological record: An overview

All mammals have two sets of teeth: a set of primary, deciduous teeth that are lost after weaning and a set of secondary, permanent teeth; in humans, the primary

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[3] L. Pezo Lanfranco and S. Eggers, 'Caries through Time: An Anthropological Overview', in M.-Y. Li (ed.), *Contemporary Approach to Dental Caries* (IntechOpen, 2012), 3-32, doi: 10.5772/38059; O. Langsjoen, 'Diseases of the Dentition', in A. C. Aufderheide and C. Rodríguez-Martín (eds), *The Cambridge Encyclopedia of Paleopathology* (Cambridge, 1998), 393-412, p. 393; Waldron, *Palaeopathology*, pp. 236-48.

dentition contains twenty teeth while the secondary has thirty-two.[4] The permanent dentition is made up of four types of teeth (incisors, canines, pre-molars, and molars), each with a different function related to processing food.[5] Teeth consist of four primary tissues: enamel, dentine, cementum, and dental pulp. Enamel, the outer-most protective layer, is almost entirely made up of mineral content (96%), making it among the hardest substances in the body.[6] The second layer, dentine, also called the root of the tooth, forms another layer of protection for the pulp, though it is less hard than enamel. Cementum, a bony connective tissue, links the root of the tooth to the periodontal ligament.[7] Finally, the pulp, the inner-most part of the tooth, contains the soft tissue. Collectively, the tissues supporting and affixing a tooth to the alveolar bone are called the periodontium.[8] While this study concentrates on teeth, an analysis of dental health cannot ignore the surrounding tissues, such as the gingiva (gums) and alveolar bone.

With this anatomical background, it is now possible to consider the types of pathologies recorded in the skeletal remains. Caries, a term derived from the Latin *caries*, meaning decay or rottenness, is 'the most common cause of oral pain and tooth loss' and 'one of the few conditions which has been recorded unfailingly in almost all reports on human remains from archaeological sites'.[9] As seen in Figure 7.2, the

[4] Langsjoen, 'Diseases of the Dentition', p. 394.
[5] Ibid, p. 395. As this chapter focuses on the state of dental health generally, it is unnecessary to detail the nomenclature and annotation used to describe each tooth and tooth area, but it is important to note that there are several systems used to record the state of teeth uncovered in excavations, including the International Coding System (recommended by the Federation Dentaire Internationale) and the Standards System (similar to the ICS but with a visual format); differences in recording and analysing teeth and associated pathologies may account for some of the variation observed when comparing results from multiple sites. For more information on tooth anatomy, see S. Hillson, *Dental Anthropology* (Cambridge, 1996), especially pp. 6-105.
[6] Langsjoen, 'Diseases of the Dentition', p. 396.
[7] Ibid.
[8] Ibid.
[9] First quotation from Waldron, *Palaeopathology*, p. 236; second quotation from S. Hillson, 'Recording Dental Caries in Archaeological Human Remains', *International Journal of Osteoarchaeology* 11 (2011), 249-89, p. 249. It is important to note that the term 'caries' remains the same whether singular or plural.

Carolingian monk from Lorsch with whom this chapter opened was suffering from multiple carious lesions when he died. The disease is a progressive bacterial condition that affects the calcified dental tissues, demineralising the inorganic material and destroying the organic components.[10] Caries tends to occur at two different locations on the tooth surface, either at the crown or the root, resulting in several types of lesion with differing aetiologies.[11] Coronal caries begin with the destruction of the enamel, then the dentine, and eventually penetrate the pulp chamber; molars and pre-molars tend to be the most affected by this type of lesion due to their complex network of fissures, fossae and groves.[12] Root caries occur more frequently in later life due to the effects of periodontal disease (addressed below), whereby the recession of the gingivae and underlying supporting tissues exposes a tooth's cementum and roots, making them susceptible to infection.[13]

In their review of evidence for caries from prehistory to the present day, Luis Pezo Lanfranco and Sabine Eggers reported that the disease reached a peak in the early middle ages, having increased steadily from *c.* 1200 BC.[14] This small peak was followed by a period of relative stability for several centuries, before rising dramatically with the largescale introduction of sugar in the early modern period.[15] Although skeletal evidence indicates that both sexes were heavily affected by carious lesions, males tend to exhibit a lower prevalence of caries than females. While the cause of this difference continues to be debated, females may be predisposed to the development of caries due to earlier tooth eruptions and hormonal fluctuations as well as 'culturally regulated' differences, such as gendered access to certain foods in some populations.[16] The recording and analysis of caries in the archaeological record is complicated by a number of other pathologies, such as the effects of abrasion or the

[10] Langsjoen, 'Diseases of the Dentition', p. 402.
[11] Hillson, 'Recording Dental Caries in Archaeological Human Remains', p. 250.
[12] Ibid.
[13] Ibid.
[14] Pezo Lanfranco and Eggers, 'Caries through Time', p. 8.
[15] Ibid, pp. 8-9.
[16] Ibid, p. 17.

accumulation of dental calculus; I shall comment on these conditions individually before addressing their interactions.

The aging process has been linked to a number of degenerative changes in the dentition. Attrition (wear), erosion, and abrasion are not 'regarded as developmental anomalies or inflammatory lesions…Yet, because they are all manifestations of hard tissue loss and often appear in combination, they are commonly treated as a group'.[17] Paradoxically, the rate of attrition and abrasiveness of an individual's diet have been tied to both the development *and* inhibition of caries.[18] On the one hand, abrasive foods and extensive wear may increase the risk of chipping teeth; these conditions create spaces for dental plaque to accumulate and expose lines of weakness and/or areas of dentine'.[19] However, a high level of dental wear and abrasion might erode the carious tissue and dislodge plaque, protecting the teeth from the accumulation of bacteria.[20] The degree to which these aging processes support or inhibit the initiation of caries remains a contentious issue in the field.

Dental calculus also presents a complex relationship with caries. Deposits of calculus are formed over time as plaque, a biofilm made up of bacteria and fragments of food particles, accumulates on the surface of a tooth and eventually mineralises.[21] In theory, there is an inverse relationship between the development of caries and the build-up of calculus since the latter requires an alkaline environment (resulting in net mineralisation) while the former requires an acidic environment (resulting in net demineralisation).[22] Both pathologies, however, are often found together, indicating that many other factors play a role in the development of both caries and calculus.[23]

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[17] Langsjoen, 'Diseases of the Dentition', p. 398.
[18] Hillson, 'Recording Dental Caries in Archaeological Human Remains', pp. 263-5.
[19] Ibid, p. 263.
[20] Ibid.
[21] Waldron, *Palaeopathology*, pp. 240-1.
[22] Ibid.
[23] Hillson, 'Recording Dental Caries in Archaeological Human Remains', p. 265; Waldron, *Palaeopathology*, p. 241.

Periodontal disease (periodontitis) is a chronic, destructive inflammatory process that affects the tissues of the periodontium over time.[24] This occurs as plaque accumulates at the gum margin and is one of the main causes of ante-mortem tooth loss (AMTL), a topic addressed in more detail below.[25] In the archaeological record, the condition is identified by a receded alveolar margin and the bone often exhibits signs of inflammation and remodelling.[26]

Cysts, abscesses, and granulomas are three different types of periapical lesions (i.e., lesions found at the apex of the tooth) that are caused by an infection of the dental pulp.[27] If the infected tooth is not removed, the infection induces an immune response in the periapical tissue, a cavity.[28] While acute abscesses and granulomas tend to be less than 3 mm, cysts and chronic abscesses can be much larger, making them easily recognisable in the archaeological record (as seen in Figures 7.5 and 7.6 below).[29]

Tooth loss, though not necessarily pathological, must also be mentioned since many teeth may be missing from excavated skeletal remains. It is often possible to determine whether teeth were lost before or after death based on the appearance of the tooth's socket. Post-mortem tooth loss (PMTL), which can occur as a result of taphonomic processes or during excavation and conservation, leaves a 'pristine' tooth socket with no signs of remodelling.[30] In the case of AMTL, the alveolar bone will 'show some degree of remodelling' and the socket will eventually smooth over (an example of a jaw with extensive AMTL can be seen below in Figure 7.7a).[31] AMTL is a useful measure of dental health since teeth tend to be lost as a result of carious lesions, periodontal disease, and/or intentional extraction due to these causes, though it must be remembered that they can also be lost due to trauma, non-medical extraction

24 Langsjoen, 'Diseases of the Dentition', pp. 398-9.
25 J. R. Lukacs, 'Oral Health in Past Populations: Context, Concepts, and Controversies', in A. L. Grauer (ed.), *A Companion to Paleopathology* (Chichester, 2012), 553-81, p. 560.
26 Waldron, *Palaeopathology*, p. 240.
27 Waldron, *Palaeopathology*, pp. 241-3; Lukacs, 'Oral Health in Past Populations', p. 560.
28 Waldron, *Palaeopathology*, pp. 241-3; Langsjoen, 'Diseases of the Dentition', p. 408.
29 Waldron, *Palaeopathology*, pp. 241-3.
30 Ibid, pp. 238-9.
31 Ibid.

(such as ritual or cosmetic extractions), and other diseases (such as scurvy).[32] Despite often being able to differentiate AMTL from PMTL, it remains largely impossible to determine the cause of AMTL. It is therefore very important to remember that the reported incidence of carious lesions in archaeological contexts most probably under-reports the actual incidence of caries since some cases of AMTL were almost certainly due to the disease. In terms of recording caries, the biases created by attrition and dental calculus must also be mentioned. Heavy attrition and calculus build-up may erase or obscure the existence of carious lesions.[33]

Finally, temporomandibular joint disease and dental enamel hypoplasia will not be discussed in this chapter, despite their potential to be recorded in the dental/skeletal remains. Temporomandibular joint disease, or osteoarthritis of the jaw, is less concerned with oral health, though it occurs in the same area of the body, and more reflective of osteoarthritic changes over time.[34] Dental enamel hypoplasia, mentioned in relation to the Lorsch monk pictured above (see especially Figure 7.3), documents periods of stunted growth that coincided with the time at which the tooth was developing. The disruption of growth in infancy and childhood is generally due to poor nutrition, starvation, or disease at a 'life-threatening magnitude of severity'.[35] As such, dental enamel hypoplasia is understood as a non-specific indicator of stress and is studied in relation to diet, nutrition, and overall disease load. Although the striations caused by enamel hypoplasia weaken that band of enamel, and thus present sites that are more prone to developing caries, the condition is not otherwise linked to dental disease and will therefore be omitted from the following analysis.[36]

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[32] Ibid.
[33] Hillson, 'Recording Dental Caries in Archaeological Human Remains', p. 264.
[34] Langsjoen, 'Diseases of the Dentition', pp. 399-400; Lukacs, 'Oral Health in Past Populations: Context, Concepts, and Controversies', p. 560. As a joint disease presenting with eburnation and other osteoarthritic features, it would make more sense to consider this condition in Chapter 8 (it will not be addressed, however, given the chapter's focus on post-cranial joints).
[35] Langsjoen, 'Diseases of the Dentition', pp. 405-7.
[36] Hillson, 'Recording Dental Caries in Archaeological Human Remains', p. 265; Waldron, *Palaeopathology*, pp. 265-7.

2. The skeletal evidence for oral pathologies

Stereotypes of medieval dentition are often extremely negative. Caricatures of medieval people have ensured that the popular image of pre-modern teeth is one of decay, disease, and poor hygiene. Is this picture a gross exaggeration or a fairly accurate portrayal of the situation? The review of caries over time conducted by Pezo Lanfranco and Eggers noted that carious lesions, as recorded by archaeological evidence, increased during classical and late antiquity and then peaked in roughly 750 AD.[37] Their findings suggest that common assumptions about the state of medieval oral health may not be far from the truth.

The dental health of the individual from Lorsch highlighted above, however, might not have been *as* bad as popular stereotypes would have one imagine. Although he clearly suffered from carious lesions, was missing teeth, and exhibited deposits of calculus, these features must be considered in more detail. The missing teeth, for example, appear to have been lost post-mortem (see Figure 7.2) and the build-up of calculus is relatively light (see Figure 7.3). While it cannot be said that his dental health was *good*, it was also not extremely poor. How does his dental record fit with the rest of the sample from Lorsch? How does the Lorsch assemblage compare to other sites in early medieval Europe? Although a complete analysis of the Lorsch skeletons has not been published (and research is still ongoing), I have drawn attention to this individual and shall share additional evidence from Lorsch for several key reasons relating to points raised in Chapter 6. First, while a full osteological report would be ideal, the initial results presented in a preliminary exhibition and report, including photographs of the dental remains, allow for a number of observations to be made and, unlike many sites, illustrated. Here, it is also important to remember that this dissertation is more concerned with the presence or absence of certain pathologies rather than exact quantifications of the data, thereby making these preliminary findings helpful, despite showcasing only a sample of the Lorsch assemblage.[38]

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[37] Pezo Lanfranco and Eggers, 'Caries through Time', pp. 8-9.
[38] See Chapter 6 for more information on this dissertation's use of the osteological evidence.

***Figure 7.4**: Caries (Kropp, Kirsch, Rosendahl, et al.,* Begraben und Vergessen?*)*

The next question concerns Lorsch's general representativity. Due to differences in diet and living conditions around early medieval Europe, dental health would have varied across populations around the Carolingian Empire—a single site should not, therefore, be taken as representative of 'Carolingian dental health'. Lorsch is, however, a particularly relevant sample to study given that its scriptorium is known to have produced medical texts, such as the *Lorscher Arzneibuch*, during this period.[39] As this compendium contains recipe collections comparable to many of those involved in this dissertation, highlighting osteological evidence from Lorsch is thus justified.

Furthermore, radiocarbon dating has been applied to a selection of the sixty-six skeletons uncovered at Lorsch, providing evidence of burials, such as the individual whose dentition can be seen in Figures 7.1-3, dated to the Carolingian period. However, the site continued to be used over the following centuries, meaning that some of the presently un-dated individuals may post-date the Carolingian period.[40] Yet, given that the entire Lorsch assemblage predates the introduction of sugar by several centuries, it is unlikely that major shifts in dental health occurred at Lorsch for

[39] Bamberg, Staatsbibliothek, Msc. Med. 1; Stoll, Das Lorscher Arzneibuch; Bischoff, Die Abtei Lorsch im Spiegel ihrer Handschriften; Keil and Schnitzer (eds), Das Lorscher Arzneibuch und die Frühmittelalterliche Medizin.
[40] Personal communications with members of the scientific board of Lorsch, including Claus Kropp and Hermann Schefers.

***Figure 7.5**: Dental calculus (Kropp, Kirsch, Rosendahl, et al.,* Begraben und Vergessen?*)*

the entire period in question.[41] The skeletal sample thus provides a useful entry point into this discussion—while evidence from a range of sites will be reviewed below, the material from Lorsch sets the scene and offers images of many of the pathologies under discussion.

According to the scientific board at Lorsch, the dental material excavated at the site contains a relatively high percentage of teeth affected by caries.[42] Figure 7.4 illustrates two examples of teeth from Lorsch severely damaged by carious lesions. Many teeth also exhibit calculus deposits, and often of a higher degree than that seen in the opening example: compare the relatively light presence of calculus seen in Figure 7.3 with the much heavier accumulation seen in Figure 7.5. The grayish-white deposits are highly visible in the three remaining molars of the maxilla. Figure 7.5 also records the existence of a large cyst in the mandible that probably stemmed from a carious lesion in the molar, now missing, under which it is located. Similarly, Figure 7.6 provides evidence of both extensive calculus deposits (best seen on the left-most tooth) and a deep abscess in the mandible. In this case, the abscess has clearly exposed the root of a tooth affected by a carious lesion. This selection of images, combined with the general assessments made by the researchers at Lorsch, speaks to the overall poor state of dental health in medieval Lorsch.

[41] Pezo Lanfranco and Eggers, 'Caries through Time', pp. 8-9.
[42] Personal communications with members of the scientific board of Lorsch, including Claus Kropp and Hermann Schefers.

***Figure 7.6**: Abscess (Kropp, Kirsch, Rosendahl, et al.,* Begraben und Vergessen?*)*

Yet despite these general signs of dental disease, it must be stressed that the sample from Lorsch also displays a high degree of variability. Consider, for example, the two jaws pictured in Figure 7.7. The first image shows clear signs of extensive AMTL: not a single tooth remains in this mandible and nearly all sockets appear to have been fully remodelled, suggesting that the vast majority of teeth were lost at least several years before the individual died. This example fits with the evidence highlighted above, adding further weight to the picture of poor dental health. The second image, however, provides a striking contrast. In this case, all of the teeth are present and intact; none exhibits signs of caries, extensive calculus, or periodontal disease; and there is little evidence of attrition. This serves as a useful reminder, illustrating that, even at sites with many examples of dental pathologies, there is often a spectrum of oral health.

***Figure 7.7**: Contrasts within Lorsch: extreme AMTL (left) vs. near perfect teeth (right) (Kropp, Kirsch, Rosendahl, et al.,* Begraben und Vergessen?*)*

Moving beyond Lorsch, variation can also be seen between sites. While this may be due to differences in the excavation and recording systems employed by distinct research teams, differences in diet and other health factors may have resulted in varying levels of dental health around early medieval Europe. Consider the difference between the findings at the sites of Biel-Mett and San Lorenzo di Desenzano. The report from Biel-Mett, a cemetery in the present-day Canton of Bern used from the late sixth or early seventh centuries to the late eighth or early ninth centuries, included an assessment of the dentitions from forty-three skulls. The authors noted that ‘most of the individuals had suffered from periodontal disease’ and that the population exhibited a high degree of abrasion as well as relatively high frequency of caries (30% of teeth were affected) and AMTL (23%).[43] In contrast, archaeologists working at San Lorenzo di Desenzano, a northern Italian site whose second phase of use has been dated to the Carolingian period, recorded significantly fewer incidences of oral pathologies. Caries were noted in only 6.1% of teeth, AMTL accounted for just 10.8% of teeth, and very few abscesses were observed.[44] While the significant differences between these two sites could be in part due to differences in the excavation and data recording methods employed by the archaeologists responsible for this work, it is likely that these populations experienced different living conditions (and especially variations in diet), and it is these differences that explain the contrasting reports. Regardless, even though San Lorenzo di Desenzano appears to have had relatively good dental health, some individuals still suffered from caries, AMTL, and abscesses.

Age is another factor that may help to explain a large degree of variation in results. Excavations at the Merovingian-Carolingian cemetery in Cherbourg, for example, uncovered 111 subadult individuals dating from the seventh to eleventh centuries.[45] Within this sample, there was no evidence of carious lesions on permanent

[43] J. Roulet and S. Ulrich-Bochsler, ‘Zahnärztliche Untersuchung frühmittelalterlicher Schädel aus Biel-Mett’, *Schweizerische Monatsschrift für Zahnheilkunde* 89 (1979), 526-40, p. 526.
[44] A. Canci, A. Chavarría Arnau, and M. Marinato, ‘Il cimitero della chiesa altomedievale di San Lorenzo di Desenzano (BS): note di bioarcheologia’, in F. Redi and A. Forgione (eds), *VI congresso nazionale di archeologia medievale* (Florence, 2012), 452-5.
[45] V. Garcin, P. Velemínsky, P. Treny, et al., ‘Dental Health and Lifestyle in Four Early Mediaeval Juvenile Populations’, *HOMO – Journal of Comparative Human Biology*, 61 (2010), 421-39.

teeth, while only 1.3% of deciduous teeth were affected by the disease.[46] This is a strikingly low incidence of caries and unlike any other site involved in the present study: barely any carious lesions were reported despite the relatively large sample size. The results appear less unusual, however, when the age of the individuals is considered. This study focused on a sample of subadults, meaning that, at the time of their death, their teeth had been exposed to cariogenic environments for only a short period of time. Since caries is an age-linked disease that progresses over time, this very low frequency would be expected.

Excepting cases like Cherbourg, most sites lean more towards the Lorsch or Biel-Mett end of the spectrum, exhibiting moderate to high levels of caries and AMTL. The excavation report of the cemetery at Santa Maria Assunta di Cairate, a rural monastic site used from the late sixth to ninth centuries, provides a detailed assessment of the dental remains recovered from three distinct burial areas.[47] The dental material from Group A, which included sixteen individuals, nearly all of whom were female, were relatively poorly preserved: only fifty-two teeth (out of a possible 512) were identified and all maxillae and mandibles were fragmentary.[48] Given this state of preservation, it is perhaps not surprising that only three individuals exhibited signs of caries. However, the carious lesions of one of these individuals were very severe and, despite the fragmentary nature of the jaw bones, extensive AMTL was noted.[49] Group B, which appeared to be the burial area for an elite family, included eight individuals.[50] Although only one individual recorded evidence of caries, this was a particularly

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[46] Garcin, Velemínsky, Treny, et al., 'Dental Health and Lifestyle in Four Early Mediaeval Juvenile Populations: Comparisons between Urban and Rural Individuals, and between Coastal and Inland Settlements', p. 430.

[47] A. Mattucci, C. Ravedoni, and E. Rettore, 'Analisi antropologica e paleopatologica della popolazione rinvenuta nel monastero dell'Assunta di Cairate', in V. Mariotti (ed.), *Un monastero nei secoli Santa Maria Assunta di Cairate: scavi e ricerche* (Mantua, 2014), 519-32.

[48] Mattucci, Ravedoni, and Rettore, 'Analisi antropologica e paleopatologica della popolazione rinvenuta nel monastero dell'Assunta di Cairate', pp. 520, 524-5.

[49] Ibid, pp. 524-5.

[50] Ibid, pp. 520-1.

severe case: thirteen teeth, mostly premolars and molars, were affected.[51] Finally, the dental remains of Group C, representing the population of the surrounding area, also experienced relatively poor preservation, and only fifteen of the sixty-eight individuals uncovered were analysed.[52] Yet within this sample, eight individuals exhibited carious lesions (five of whom were female), representing a higher frequency of caries than what was reported in Groups A and B. Again, premolars and molars were the most affected teeth.[53]

A much less detailed analysis of the dental remains was provided in the excavation reports from Acqui Terme, Corso Roma, and Rivoli, La Perosa: the authors noted that both of these cemeteries, the former dated to the seventh to ninth centuries and the latter used from the sixth to eighth centuries, exhibited a high level of AMTL and caries, seriously affecting the populations in question.[54] Indeed, at least one carious lesion was recorded on all of the female individuals studied and nearly two-thirds of the males.[55] Likewise, caries were reported for approximately two-thirds of the fifty-eight adults excavated at San Lorenzo di Quingentole, a cemetery used from the late sixth or early seventh to eighth centuries.[56] At Bolgare, a late Lombard necropolis containing the remains of over 400 individuals, the widespread presence of carious lesions was noted, but the results were not elaborated.[57] In contrast to these particularly high frequencies, only two out of eleven individuals (18.2%) uncovered at the Church of San Zeno, Campione d'Italia, a site thought to have been used by the

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[51] Ibid, pp. 524-5.
[52] Ibid, pp. 521-3, 525.
[53] Ibid, p. 525.
[54] F. Mallegni, E. Bedini, A. Vitiello, et al., 'Su alcuni gruppi umani del territorio piemontese dal III-IV al XVIII secolo: aspetti di paleobiologia', in L. Mercando and E. Micheletto (eds), *Archeologia in Piemonte*, 3 vols (Turin, 1998), III, 233-61.
[55] Mallegni, Bedini, Vitiello, et al., 'Su alcuni gruppi umani del territorio piemontese dal III-IV al XVIII secolo', 233-61.
[56] M. Dal Poz, F. Ricci, B. Reale, et al., 'Paleobiologia della popolazione altomedievale di San Lorenzo di Quingentole, Mantova', in A. Manicardi (ed.), *San Lorenzo di Quingentole: archeologia, storia ed atropologia* (Mantua, 2001), 151-95.
[57] C. Cattaneo and A. Mazzucchi, 'Popolazioni tardo antiche e dell'alto medioevo narrate dai resti ossei: il progetto di una banca dati lombarda' in P. M. De Marchi and S. Pilato (eds), *La via Carolingia. Uomini e idee sulle strade d'Europa* (Mantua, 2013), 87-98.

descendants of the Lombard merchant Totone, exhibited signs of caries.[58] One of these individuals, however, a male aged forty-five to fifty-five years old, presented numerous carious lesions, reflecting the progressive nature of the disease.[59]

Although this review has focused primarily on caries, other aspects of dental health, such as patterns of attrition, evidence of periodontal disease, and the presence of calculus and abscesses are also discussed in some of the more detailed excavation reports. Consider, for example, the single burial found in the church of San Vito di Illegio in Tolmezzo, Udine, that contained a male aged approximately fifty.[60] Dated to the Carolingian period, this individual exhibited evidence of mild periodontitis and deposits of dental calculus. Notably, his teeth were very worn, and this high degree of attrition may explain the relatively low levels of caries reported.[61]

As noted above, the report from Santa Maria Assunta di Cairate offered a detailed analysis of the dental remains uncovered in the cemetery. Individuals from Group A, despite their fragmentary nature, exhibited evidence of periodontitis and a significant build-up of calculus, especially on the canines and premolars.[62] Moderate levels of attrition and two cases of abscesses were also recorded. In Group B, all recovered teeth exhibited evidence of wear, though it was relatively light, and, in one case, a large amount of calculus had accumulated.[63] Attrition was greater in Group C, with most individuals exhibiting a moderate level of wear; four individuals, however,

[58] Note: this site contains many more individuals when all phases of use are considered; phase 2, with eleven individuals, was the most relevant period of use to include in this study. P. Blockley, R. Caimi, D. Caporusso, et al., 'Campione d'Italia. Scavi archeologici nella ex chiesa di San Zeno', in S. Gasparri and C. La Rocca (eds), *Carte di famiglia. Strategie, rappresentazione e memoria del gruppo familiare di Totone di Campione (721-877)* (Rome, 2005), 29-80.
[59] Blockley, Caimi, Caporusso, et al., 'Campione d'Italia. Scavi archeologici nella ex chiesa di San Zeno', pp. 56-8.
[60] V. Amoretti, A. Cagnana, P. Greppi, and A. Saccocci, 'Lo scavo della chiesa di San Vito di Illegio (Tolmezzo, UD). Una "Eigenkirche" carolingia nelle alpi carniche', in P. Favia and G. Volpe (eds), *V congresso nazionale di archeologia medievale* (Florence, 2009), 487-91.
[61] Amoretti, Cagnana, Greppi, and Saccocci, 'Lo scavo della chiesa di San Vito di Illegio (Tolmezzo, UD), pp. 487-91.
[62] Mattucci, Ravedoni, and Rettore, 'Analisi antropologica e paleopatologica della popolazione rinvenuta nel monastero dell'Assunta di Cairate', pp. 524-5.
[63] Ibid.

showed signs of exceptionally intense wear, resulting in the erosion of the dental crown to the layer of dentine in some teeth.[64] Calculus was noted on the teeth of many individuals, with a particularly large amount reported on two males. Four severe abscesses were recorded, with three of the four cases affecting females.

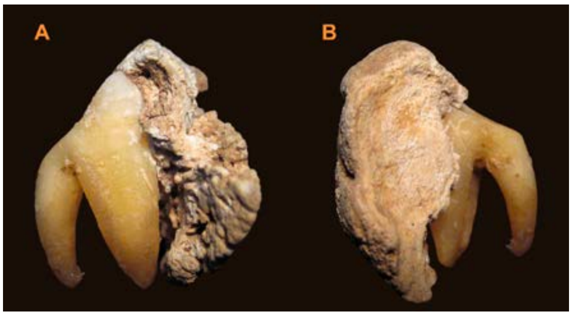

***Figure 7.8**: Extreme dental calculus (Hansen and Alt, 'An Exceptional Case of Dental Calculus in a Merovingian Skeleton from Mannheim-Seckenheim')*

Although a complete analysis of the dental remains for all of the skeletons (over 900) excavated at Mannheim-Seckenheim, a cemetery used from the sixth to eighth centuries, has yet to be published, one exceptional case has been studied in detail.[65] The individual buried in grave 595 exhibited dental calculus on seven of nine recovered teeth, with two teeth displaying an extremely large build-up of calculus, 'almost dwarfing the teeth themselves', as illustrated in Figure 7.8.[66] Five periapical lesions were also noted in the sockets of teeth that were lost ante-mortem and caries were present on one of the remaining teeth, revealing that this individual suffered from very poor dental health.[67] The size of the calculus deposits, however, are the most notable feature: their dimensions 'indicate that the teeth were not used for mastication for some time before death', suggesting that this individual must have consumed a particularly liquid diet in the final years of their life.[68]

[64] Ibid, p. 525.
[65] J. L. Hansen and K. W. Alt, 'An Exceptional Case of Dental Calculus in a Merovingian Skeleton from Mannheim-Seckenheim', *Bulletin of the International Association for Paleodontology* 6 (2012), 70-6.
[66] Hansen and Alt, 'An Exceptional Case of Dental Calculus in a Merovingian Skeleton from Mannheim-Seckenheim', p. 72.
[67] Ibid.
[68] Hansen and Alt, p. 72. And, in fact, when considering the handful of sites that recorded exceptionally low levels of carious lesions, other factors, such as the age of the individuals studied, may help to explain the stark contrast, see Garcin, Velemínsky, Treny, et al., 'Dental Health and Lifestyle in Four Early Mediaeval Juvenile Populations', pp. 421-39.

The findings reviewed above indicate that many early medieval individuals suffered from a number of different oral health problems. Although there are significant variations between sites, it is evident that dental disease would have been a serious concern for all populations: carious lesions were recorded at all sites involved in the present study and are a common cause of AMTL. The loss of teeth in life was probably not only a very painful process, but also potentially debilitating, affecting an individual's ability to eat as well as their appearance. Although most reports did not comment on sex-based differences, at several sites, such as Santa Maria Assunta di Cairate, women were more frequently affected by caries, a result that fits with studies from other periods.[69] Molars and premolars were noted as being the teeth most frequently affected by carious lesions by several reports (and illustrated by Figures 7.3 and 7.4), findings that also correspond with the scientific literature on the disease.[70] Finally, although many excavation reports focused less on periodontal disease, abscesses, and calculus build-up, these conditions were considered in the more detailed analyses, such as the in-depth review from Santa Maria Assunta di Cairate and the study of the individual from Mannheim-Seckenheim. Overall, the generally high frequency of caries and AMTL, combined with the presence of a number of other pathologies, such as abscesses and periodontitis, reported at some sites, suggests that dental disease took a significant toll on many individuals during this period.

Remedies for dental disease

As might be expected based on the archaeological record, early medieval medical texts preserve many examples of treatments for dental problems. An in-depth review of the recipes may provide deeper insights into the nature of this overlap: do treatments comment on particular symptoms or describe specific problems they target? Does the evidence presented by the osteological remains fit with or challenge our

[69] Pezo Lanfranco and Eggers, 'Caries through Time', p. 17.
[70] Hillson, 'Recording Dental Caries in Archaeological Human Remains', p. 250.

reading of the texts? I shall review the recipes relating to oral pathologies before addressing their potential applicability in the following section.

Out of the 4335-recipe sample, I have identified 229 recipes that are intended to treat either tooth problems directly or oral health more generally. In other words, over five percent of all recipes analysed in this study address dental disease and related concerns. I subdivided the 229 recipes into the following ten categories: 1) toothache, 2) mouth sores, 3) tooth loss (including loose teeth), 4) putridity, 5) gum problems, 6) cosmetics, 7) molar-targeted recipes, 8) age-based recipes, 9) rheumatism-related recipes, and 10) problems understood to be caused by animals (see Table 7.1). The categories, some of which may not make sense to a modern reader (though they will be considered in more detail below), are based primarily on recipe titles and, where applicable, any additional information provided within recipes. There is some degree of overlap between the categories: who is to say that a mouth ulcer (falling under the 'mouth sores' category) would not have produced a horrible smell (and could therefore be classified under 'putridity') or that a treatment for painful gums was not simultaneously intended to alleviate toothache? This system of classification, while somewhat subjective, seems to be the most appropriate method as it is structured around the ways in which the recipes are presented: if an early medieval reader came across this text, what would the recipe seem to be intended to treat? Or if an individual were seeking a treatment for a particular condition, what key words would they look for in a recipe collection? Such categories therefore aim to minimise inappropriate retrospective diagnoses as much as possible.[71]

[71] For example, I have categorised recipes that mention worms, such as *Ad uermis uel fistola in os uulneris* of csg. 759, as 'problems understood to be caused by animals' rather than attempting to interpret this description according to modern medical terminology and classify it as a condition more recognisable to modern readers (see csg. 759, p. 51).

Table 7.1 Categories of dental pathologies		
Categories	# of recipes	% of total (229)
Toothache	100	43.7%
Mouth sores	33	14.4%
Tooth loss	29	12.7%
Putridity	19	8.3%
Gum Problems	17	7.42%
Cosmetics	10	4.37%
Molar-targeted	7	3.06%
Age-related	3	1.31%
Rheumatism	7	3.06%
Animals	4	1.77%

Before considering each category, the specificity of these recipes must be mentioned (see Table 7.2). As discussed in Chapter 6, I divided recipes into non-specific, semi-specific, and highly specific categories. In this case, non-specific recipes represent very broad, cure-all treatments while semi-specific recipes are more narrowed but continue to treat multiple issues, such as general head pain *and* toothache. I have classified all recipes that target oral pathologies exclusively as highly specific (even in cases where multiple oral pathologies are listed). Overall, there are very few non- and semi-specific recipes: out of the 229 dental recipes, only sixteen (7.0%) and twenty-seven (11.8%) could be categorised as non- and semi-specific, respectively. The vast majority, 186 (81.2%), are highly specific treatments. With the general categorisation and specificity of the dental recipes in mind, it is possible to consider the treatments in more detail.

Table 7.2 Specificity of dental pathologies		
Specificity	# of recipes	% of total (229)
NS	16	6.99%
SS	27	11.8%
Sp	186	81.2%

1. CATEGORY 1: TOOTHACHE

As seen in Table 7.1, 100 treatments mention toothache, *dentium dolorem*, totalling nearly half (43.7%) of all of the recipes that claim to treat dental conditions. Tables 7.3 and 7.4 provide a breakdown of the data based on both specificity and categories. Ten treatments for toothache (10%), such as the *Antidotum sancti paulini* of BAV reg. lat. 598 or *Antidotus atrianus* of csg. 217, are found in non-specific contexts.[72] In both cases, the antidotes claim to treat a host of different conditions, including *dentium dolorem*. Nine of the ten non-specific recipes are cure-all antidotes, while one, found in csg. 44, is a recipe for rose oil. The *Oleo roseo* recipe provides a list of possible applications, such as stomach problems, head pain, and uterine issues as well as toothache.[73]

Just over a quarter of toothache recipes, twenty-six, are semi-specific (see Table 7.4 below). In all cases, the recipe is intended for a more general condition of the head and lists toothache secondarily. On pp. 257[a]-258[b] of csg. 217, for example, a cluster of ten recipes can be found under the heading *Ad capitis*.[74] The first recipe then specifies what this recipe is intending to treat: head pain as well as ear conditions, problems in the mouth (unspecified), and long-standing tooth pain, *dentem diutius dolentibus*. The following nine recipes simply begin with *Item*, 'likewise', so it can be assumed that the entire cluster concentrates on the range of conditions presented by the first entry.

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[72] BAV reg. lat. 598, f. 124[r]; Csg. 217, p. 262.
[73] Csg. 44, p. 256: …et ad dentium dolorem in or missus facit…
[74] Csg. 217, pp. 257[a]-258[b].

Table 7.3
Categories of dental pathologies with breakdown of specificity

Categories	Total # of recipes % of 229	NS # of recipes % of 16	SS # of recipes % of 27	Sp # of recipes % of 186
Toothache	100 43.7%	10 62.5%	26 96.3%	64 34.4%
Mouth sores	33 14.4%	2 12.5%	0	31 16.7%
Tooth loss	29 12.7%	1 6.25%	1 3.7%	27 14.5%
Putridity	19 8.3%	1 6.25%	0	18 9.68%
Gums	17 7.42%	1 6.25%	0	16 8.6%
Cosmetics	10 4.37%	0	0	10 5.38%
Molar-targeted	7 3.06%	1 6.25%	0	6 3.23%
Age-related	3 1.31%	0	0	3 1.61%
Rheumatism	7 3.06%	0	0	7 3.76%
Animals	4 1.77%	0	0	4 2.15%

Table 7.4
Specificity of dental pathologies with breakdown of categories

Specificity	1) Toothache	2) Mouth sores	3) Tooth loss	4) Putridity	5) Gums
	# of recipes per 100 total	# of recipes per 33 total	# of recipes per 29 total	# of recipes per 19 total	# of recipes per 197total
NS	10 10%	2 6.06%	1 3.45%	1 5.26%	1 5.88%
SS	26 26%	0	1 3.45%	0	0
Sp	64 64%	31 93.9%	27 93.1%	18 94.7%	16 94.1%

Specificity	6) Cosmetics	7) Molar-targeted	8) Age-based	9) Rheuma-tism	10) Animals
	# of recipes per 10 total	# of recipes per 7 total	# of recipes per 3 total	# of recipes per 7 total	# of recipes per 4 total
NS	0	1 14.3%	0	0	0
SS	0	0	0	0	0
Sp	10 100%	9 85.7%	3 100%	7 100%	4 100%

However, as seen in Table 7.4, the majority of the recipes for toothache (64%) are highly specific. Essentially all of the sixty-four recipes are labelled as *Ad dentium dolorem* (or very similar variants) or occur within clusters where the first recipe has the title *Ad dentium dolorem* and the remaining recipes each come after *Item*. Consider, for example, three different two-recipe clusters in csg. 759: *Ad dentes dolorem* (p. 48), *Ad dentes ut numquam doleant* (p. 73), and *Ad dentium dolorem* (pp. 75-6).[75] In each

[75] Csg. 759, p. 48: *Ad dentes dolorem trociscus murra teris et in dentis ponis; Item nitrum teris ex uino aceto in pultario de ferueat tepefactum dentibus teneat*; p. 73: *Ad dentes ut numquam doleant rasumus de corium ceruinum in olla rude ad tertias quoquis et ipsa aqua in ore tenis una iactas alia mitis sanat mox; Item spina nigra fodis cum oratione dominici scorcia mediana de ipsa radice manipulos . iii et colas . iii . de uino de coquis ad tertias in olla rude et ipso uino in ore tenis una iactas et alia mitis mox sanat*; pp. 75-6: *Ad dentium dolorem plantagine radices turnelle radices manipula singula coquis in uino sestarius i . ad tertias et gargalicit ad solem aut ad foco sub in de usque dum sanat*; *Item milfolio bucco*

case, a second recipe (*Item*) follows the first. In addition to these small clusters, toothache treatments can be found in large groupings or as single entries. In csg. 217, a fourteen-recipe cluster for tooth pain is listed under *Item ad dentium dolorem*, whereas *De dentes dolores* from Paris BnF lat. 2849A stands alone.[76]

2. CATEGORIES 2-8: TOOTH LOSS, MOUTH SORES, GUM PROBLEMS, PUTRIDITY, COSMETICS, MOLAR-TARGETED RECIPES, AND AGE-BASED RECIPES

I shall discuss Categories 2 to 8 together due to several shared features. First, in contrast to the very large number of treatments that fell under Category 1, each of these categories includes a much smaller selection of recipes (see Table 7.1). Mouth sores and tooth loss have the second largest share of the total number of recipes, at thirty-three (14.4%) and twenty-nine (12.6%), respectively. Putridity and gum problems follow, with nineteen (8.3%) and seventeen (7.4%) treatments, respectively, while recipes related to cosmetics, molars, or age represent between one and five percent of the total, with ten, seven, and three recipes, respectively.

Secondly, as shown in Table 7.3, the recipes from all of these categories are almost entirely highly specific: only six are non-specific (5.1%) and one is semi-specific (<1%). The non-specific exceptions include two treatments for mouth sores and one each for tooth loss, gum problems, putridity, and molars; the recipes include preparations for oils, salts, and plasters, though, surprisingly, no named antidotes. Take, for example, the *Oleo lentisscinum* of csg. 44, a recipe found just two pages after the preparation for rose oil noted above.[77] In this case, the oil is said to be applicable for a fairly similar list of conditions, including uterine pain, hardness of the stomach, dysentery, and mouth sores. The one example of a semi-specific treatment comes from

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mellis lupopectine scorcia de nogario ana in simul teris et cum modice ceruisa miscus \cis/ colas mitis ubi dentes dolent apud hoc dormiat si potit tempore uiesue dentes numquam dolent.

[76] Csg. 217, p. 335; Paris BnF lat. 2849A, f. 19r.

[77] Csg. 44, p. 258: Oleo \lentis/scinum fit de semen lentisci . cum autem maturauerit . facis sicut de lauri bacas . facit autem ad omnes matricis dolorem uirtutem habet calefacturiam et stipticam malaxaturiam facit ad omnem duritiam stomachi et ad ciliacum et disentericus . et ad oris uitia . et de faciȩ omnia purgat et colorem bonum et furfures et ordeola capitis facit.

csg. 217. Within a five-recipe cluster under the title *Ad synances*, for throat constraint, the fourth entry notes that this recipe is also intended to help teeth remain in place.[78]

Having addressed the non- and semi-specific treatments, I shall concentrate on the highly specific recipes from these categories. I have grouped treatments for loose and lost teeth under the 'tooth loss' category. Regarding lost teeth, recipes are generally titled *Ad dentem cauum*, as seen in csg. 44, csg. 751, and BAV pal. lat. 1088.[79] A variety of terms are used to describe recipes intended to secure loose teeth in place. In some cases, movement is clearly noted: csg. 751 contains a recipe labelled *Item ad dentes qui mouentur* while BAV pal. lat. 1088 includes a powder titled *Puluis ad dentium commotionem*.[80] Loose teeth are also frequently described as *laxos*, as seen by treatments in csg. 751, csg. 759, and BAV reg. lat. 1143.[81] Similarly, a number of different terms suggest various types of mouth sores, such as *ulcera*, *uulnera*, and *uitia*, when used in association with dental terminology. The term *ulcera* occurs most frequently, appearing in eighteen of the thirty-one specific recipes (including clusters where individual recipe labels may simply state *Item*). Examples include *Ad ulcera oris* in BAV pal. lat. 1088, *Ad ulcera quae in ore nascuntur* in csg. 751, and *Ad ulcera oris uel quicquid in labia fuerint* in csg. 44.[82] Treatments that mention wounds appear in csg. 217 and 759, while recipes titled *Ad uitia oris* can be seen in csg. 217 and 751.[83]

Just under 95% of the recipes that I have classified as treatments targeting 'putridity' are highly specific (see Table 7.4). This category contains recipes that include terms for rottenness, decay, and bad smells in their titles and descriptions. Csg.

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[78] Csg. 217, p. 338: a final comment from the fourth entry of *Ad synances* reads *dentes constringit*.
[79] Csg. 44, p. 360: ***Ad dentem . cauum***; csg. 751, p. 472: *Item ad dentem cauam*; and BAV pal. lat. 1088, f. 35^{v}: *Item Ad dentem cauum*.
[80] Csg. 751, p. 472; BAV pal. lat. 1088, f. 50^{r}.
[81] Csg. 751, p. 385: ***Ad loxum dentem***; csg. 759, p. 5: *Ad dentis laxos*; BAV reg. lat. 1143, f. 148^{v}: *Ad dentes laxos*.
[82] BAV pal. lat. 1088, p. 35v: Ad ulcera oris uel quidquid intra labiis fuerit; csg. 751, p. 435: Ad ulcera quae in ore nascuntur; csg. 44, p. 361: **Ad ulcera oris . uel quicquid in labia . fuerint**.
[83] Csg. 217, p. 273: **Ad uulnera oris . siue tumores gingiuarum**; csg. 759, p. 5: Ad uulnera in ore; csg. 217, p. 273: **Ad uitium oris**; csg. 751, p. 435: Ad uitia oris.

217, for example, includes a five-recipe cluster with the title *Ad putridinem oris* followed by a group of nine recipes labelled *Ad fetorem oris*.[84] As noted above, this terminology is suggestive of a wider range of conditions and could therefore be linked to a number of the categories described above; however, since the titles of the recipes use such specific terminology commenting on putridity and fetidness, it seemed more appropriate to consider these treatments as a separate category.

Ten recipes, nine of which are highly specific (see Table 7.4), concern more cosmetic aspects of dental health. BAV pal. lat. 1088 and Paris BnF lat. 13955 list a number of dentifrices, powders intended to clean the teeth; these are often labelled simply as *Dentifricium*.[85] Csg. 217 also contains four recipes for tooth-whitening, two are listed under *Ad albos dentes* and two are labelled *Ad dentes candidos*.[86]

Category 7, molar-targeted recipes, includes all of the treatments that named molars as their intended area of treatment; no other type of tooth was individually mentioned in recipes. Six of the seven recipes in this category are highly specific as noted in Table 7.4. Four are found in csg. 217 under the titles *Ad dentium molariorum dolore* and *Ad dentes molares*, while two recipes located in csg. 1396 are also labelled *Ad dentes molares*.[87]

The three recipes classed as age-based treatments are intended to help teething infants. One recipe, *Ut infantibus dentes sine dolore exeant*, occurs in csg. 44 and two, *Item si infans denterit*, can be found in csg. 751.[88]

3. Categories 9 and 10: Rheumatism-related conditions and problems understood to be caused by animals

Finally, I shall address categories 9 and 10 together as they provided similar challenges. Like categories 1-8, both category labels are based on the terminology used in the recipes themselves, but unlike the earlier categories, these are much harder to fit

84 Csg. 217, pp. 273-4.
85 BAV pal. lat. 1088, ff. 50r-51r; Paris BnF lat. 13955, f. 147r.
86 Csg. 217, pp. 260, 336.
87 Csg. 217, p. 336; csg. 1396, p. 19.
88 Csg. 44, p. 304; csg. 751, p. 472.

into a modern medical understanding of dental disease and oral health. In the case of 'rheumatism-related conditions', seven specific recipes connected tooth problems with rheumatism, six of which were clustered in csg. 217 under the title *Item si dentes nimio capitis reumate relaxa*, while one, the *Puluera ad dentes reumatizarites*, was found in BAV reg. lat. 1143.[89] Since rheumatic conditions are not linked with dental health today (consider, for example, rheumatoid arthritis), it is difficult to know how to interpret these particular conditions.

Of the four recipes classified as 'problems understood to be caused by animals', three were found as a group in csg. 217 and one was located in csg. 759.[90] The three recipes in csg. 217 are entitled *Ad ranulam oris*, 'a little frog in the mouth'. Similar descriptions appear in Islamic and later medieval medical texts and refer to a swelling under the tongue; it therefore seems possible that this recipe cluster likewise describes a swelling or cyst under the tongue, drawing on a shared metaphor, but it remains open to speculation.[91] Overall, the eleven recipes of categories 9 and 10 represent less than five percent of the total number of dental health-related recipes. Given their low frequency in the written record and difficulty to interpret, I shall not address these recipes in the final section on applicability.

4. Summary

The evidence presented above reveals that treatments for dental disease and related conditions appear frequently in collections of recipes. The majority of the recipes (81.2%) represent highly specific treatments, while non- and semi-specific remedies were fairly rare. General toothache is most often mentioned and contains the highest percentage of non- and semi-specific recipes. In fact, nearly two-thirds of non-specific recipes and over 95% of semi-specific recipes concern toothache. With this

[89] Csg. 217, pp. 335-6; BAV reg. lat. 1143, f. 181v.
[90] Csg. 217, p. 273; csg. 759, p. 51.
[91] Abū al-Qāsim Khalaf ibn 'Abbās al-Zahrāwī, *Albucasis:* On Surgery and Instruments, trans. M. S. Spink and G. L. Lewis (Berkeley, 1973); J. Norri, 'Translation from Latin and French as a Source of New Medical Terms in Late Medieval England', *Romance Philology* 71 (2017), 563-622, p. 576 (Norri notes that the reason for the frog metaphor is not evident).

understanding of the textual evidence, it is possible to consider their applicability in light of the osteological evidence presented above.

Applicability

The evidence analysed in this chapter indicates that there is a significant degree of overlap between the skeletal remains and the textual record: the conditions and symptoms that dental remedies claim to treat largely fit with what is seen in the osteological evidence. To review, the vast majority of recipes target fairly standard issues, such as toothache, mouth sores, loose or lost teeth, gum problems, and putridity. The early medieval dental remains presented above show clear evidence of dental disease. Poor dental health was most often manifested by carious lesions and AMTL, though signs of periodontal disease, calculus build-up, and abscesses were also noted. Given the extent of these conditions, toothache would have been a primary concern for the populations in question, while mouth sores, tooth loss, gum disease, and putrid or foul-smelling breath (due to poor dental hygiene and the existence of dental disease) would have been significant issues. These parallels between the textual and archaeological evidence therefore indicate that many of the recipes would have been relevant to the individuals who had access to these texts and suggest that these treatments could have been consulted in the context of therapy.

While the general picture created by the evidence is thus one of applicability, several categories of recipes and subtopics deserve further analysis. The insights gained through the osteoarchaeological evidence allow us to dig deeper into the question of applicability, reassessing recipes that seem to diverge from this general picture and highlighting notable examples of overlap between the two bodies of evidence. I shall consider a) specific types of teeth, b) specific types of people, c) cosmetics, and d) possible sources for these recipes.

1. SPECIFIC TYPES OF TEETH

Molars and pre-molars, due to their fissured surfaces and less accessible location at the back of the mouth, are the teeth most susceptible to the development of carious lesions. The skeletal evidence from many early medieval sites fits this picture: the reports from a number of excavations noted that molars and pre-molars were typically the teeth most frequently and severely affected by caries. With this in mind, it is particularly notable that several recipes, such as *Ad dentes molares* of csg. 217 and 1396, targeted the molars.[92] These are, moreover, the only types of teeth to be named in the texts. Molar-specific treatments therefore correspond to the evidence provided by the osteological record, further strengthening the argument for the applicability of many of the dental recipes.

2. SPECIFIC TYPES OF PEOPLE

The skeletal evidence at some early medieval sites, such as Santa Maria Assunta di Cairate, suggested that females were more prone to developing carious lesions. These results fit with more general findings concerning sex-linked differences in the experience and severity of dental disease: certain biological and cultural factors may predispose females to developing caries. Given the direct parallel seen above in the case of molars, it might have been expected that the textual evidence would reflect this difference, as well. However, no treatments are presented for specifically female (or male) subjects and there is no apparent gender-based division of recipes. While the listing of uterine issues in a number of non-specific recipes could be seen as a possible exception to this general finding, gynaecological problems are often seen in panaceas and I would therefore suggest that a gendered reading of these recipes is inappropriate.

Despite this lack of female-specific treatments, it is important to note that a different person-based category emerged, age. Three recipes targeted teething infants. With this age-based differentiation, it is perhaps surprising that there were no recipes intended for the aging population given that the osteological evidence confirmed that the frequency and severity of dental disease increased with age. It could be argued, however, that many of the more general treatments simply would have become more applicable, thereby making recipes targeting tooth conditions of the elderly

[92] Csg. 217, p. 336; csg. 1396, p. 19.

unnecessary. In other words, recipes for toothache, mouth sores, and tooth loss could have been relevant to all age groups (once teeth had developed) and old age would not have resulted in new types of oral health problems but rather in higher frequencies of their occurrence and/or increasing severity. In contrast, the teething process is a separate issue, requiring distinct types of treatments and fitting with the overall picture of utility presented by the evidence.

3. Cosmetics

Given the evidence for severe dental disease, it may seem that dentifrices and tooth whitening treatments are somewhat irrelevant or frivolous: why worry about the whiteness of teeth if they have already been lost or are on their way out? However, I propose the opposite: the skeletal remains point to poor dental hygiene and extensive dental disease, suggesting that cleaning and whitening powders may have been highly sought-after products. When considering the contexts in which these recipes were produced, this takes on added significance. As discussed in Chapter 2, the locations at which medical texts were written and housed, whether monastic scriptoria or courtly libraries, were generally elite sites that involved the upper-most strata of society. The privileged circles of the court, aristocratic households, and ecclesiastical elite therefore offer groups of individuals who may have been especially interested in whitening their teeth and avoiding putrid breath. Monica Green has highlighted the 'continuity between "medical" and "cosmetic" concerns' in the context of women's medicine, and I argue that an interest in cosmetic recipes, such as these dental treatments, should also be seen in this light, though they may have appealed to men and women alike.[93] Furthermore, Patricia Skinner has recently argued that the emphasis on injuries (and their penalties) seen in many early medieval law codes reflects not only the practicality of maintaining law and order, but also the significance of an 'unblemished personal

[93] Green, 'Bodies, Gender, Health, Disease', p. 4.

appearance' in relation to an individual's honour.[94] While physical injuries, including, notably, dental trauma, are often listed in the law codes, more superficial damage, such as the cutting of hair, can also be found. This focus on appearance therefore fits with inclusion of cosmetic preparations in early medieval recipe collections and adds further weight to their applicability.

4. POSSIBLE SOURCES FOR DENTAL RECIPES

As noted above, it has been suggested that dental health declined between *c*. 1200 BC and *c*. 750 AD, worsening throughout classical and late antiquity.[95] With this in mind, it is interesting to think about how these remedies compare to classical texts and to consider the origins of these treatments: do many recipes derive from classical and late antique medical writings or does a wave of new material appear to have been introduced, coinciding with increasing demands for dental care? As Chapters 3, 4, and 5 have shown, both of these patterns, that of preservation and that of addition, have been identified in the recipes under analysis, and dental remedies provide many examples of each. Some recipe clusters, for example, can be linked to known sources, including the *Physica Plinii* or Marcellus of Bordeaux's *De medicamentis liber*, while in other cases, single recipes appear to have been selected from specific texts, such as *De herba vettonica liber*, and added to an MMC. Many recipes, however, have not been directly related to a classical or late antique treatise and their origins remain unknown. The presence of recipes unattributed to older texts may suggest the inclusion of information from non-textual sources, the use of texts that have since been lost, the fusion of different texts and traditions, or perhaps even innovation and experimentation. Regardless of the underlying causes for the addition of new material and mixture of influences, the resulting range of recipes relating to dental health reflects an active process of selection and reorganisation: Carolingian scribes engaged

[94] P. Skinner, 'Visible Prowess?: Reading Men's Head and Face Wounds in Early Medieval Europe to 1000 CE', in L. Tracy and K. DeVries (eds), *Wounds and Wound Repair in Medieval Culture* (Leiden, 2015), 81-101, pp. 85-9.
[95] Pezo Lanfranco and Eggers, 'Caries through Time', p. 8.

with a variety of sources and brought together this assortment of information in new and different ways. As argued in Chapter 5, the hybrid nature of MMCs further supports the idea that these recipe collections were intended to be used in practice. Indeed, the expansion of treatment options suggests that dental treatments were highly sought after, and perhaps directly in response to the general worsening of oral health noted by Pezo Lanfranco and Eggers.[96] Overall, these findings add weight to the applicability of this medical knowledge and support the possibility that recipes were intended for therapeutic uses.

Conclusion

The early medieval skeletal evidence reveals that tooth remedies would have been necessary in the Carolingian world: poor dental health, while not universal, was frequent. All sites reviewed in this chapter provided evidence of dental disease. The recipe literature displays many examples of overlap with the skeletal remains, such as treatments for tooth loss or gum problems. Based on these undeniable parallels between the textual and osteological evidence, I argue that the medical knowledge in circulation would have been highly applicable to contemporary populations. Certain recipe categories, such as those concerning appearance, suggest that these recipes would have been particularly relevant to communities with access to these manuscripts, such as elite royal, aristocratic, or ecclesiastical sites.

This opening case study has been a fairly straightforward example of overlap: reading the recipes in light of the osteological evidence suggests that these treatments were intended to be put into practice. Such an evaluation enhances our understanding of the texts by helping to understand if the recipes could have been applied in practice and, if so, to contextualise where and by whom they might have been used. In the next chapter, we shall investigate if the same can be said for joint diseases.

[96] Ibid.

Chapter 8
Joint Disease: Problematising *podagra*

Gout, an erosive arthropathy most commonly manifested by excruciating pain in the big toe caused by a build-up of uric acid crystals, is a disease with baggage. Historically, gout has been linked to elites, people with access to rich food and alcohol, though it is on the rise today, affecting between one and four percent of the population in the west.[1] Hippocrates, active in the fifth century BC, was the first to record a connection between gout and wealth, describing the condition as the 'arthritis of the rich'.[2] The link between wealth (often interpreted more specifically as dissolute overindulgence) and gout stems from the realisation that those with a meat- and alcohol-heavy diet, i.e., the elite, were more susceptible to developing the disease. Galen agreed with his predecessor, but also posited that there was a hereditary aspect to the condition.[3] Modern medical studies have confirmed that diet, sex, age, and genetics all play a role in the onset of the disease; males are more prone to developing gout and risk factors include obesity and weight gain, increasing age, a genetic predisposition, and a diet involving foods and drinks rich in purines (such as meat, seafood, and alcohol).[4] The stereotype that it tends to be seen in older, elite males is not without reason.[5]

How does this stereotype fit with the experience of individuals in early medieval Europe? Does the textual and osteological evidence support the occurrence of gout, *podagra* in Latin, during this period—or at least in certain populations? A diet rich in meat and alcohol and a more sedentary lifestyle could have been available to

[1] G. Ragab, M. Elshahaly, and T. Bardin, 'Gout: An old disease in new perspective – A review', *Journal of Advanced Research* 8 (2017), 495-511, p. 496.
[2] G. Nuki and P. A. Simkin, 'A concise history of gout and hyperuricemia and their treatment', *Arthritis Research and Therapy* 8 (2006), doi: 10.1186/ar1906.
[3] Ibid.
[4] Ragab, Elshahaly, and Bardin, 'Gout: An old disease in new perspective – A review', p. 496.
[5] Nuki and Simkin, 'A concise history of gout and hyperuricemia and their treatment', doi: 10.1186/ar1906.

males in the most privileged strata of society, such as members of royal and aristocratic households and, depending on the strictness with which dietary rules were enforced, ecclesiastical communities, or at least certain members within them.[6] This subset of the population, as discussed in Chapter 2, corresponds to those individuals who would have been among the most likely to have had access to the medical texts, thereby making gout a particularly interesting condition to investigate. Moreover, although female religious houses cannot be discounted as centres of manuscript production, the majority of the individuals in royal, aristocratic, and ecclesiastical settings with access to medical texts were probably male, adding further weight to the idea that gout treatments may have been highly relevant to individuals in these communities and marking the disease as a unique reference point for assessing the written record in light of the osteological evidence.[7]

The textual evidence for gout is strong: I identified *podagra* (and related terms) in over 100 recipes, as will be reviewed below. Indeed, remedies claiming to help sufferers of gout have already been seen in several chapters, including the two remedies with which this dissertation opened. These two remedies ascribed to a certain Terenti(an)us, the *Potio ad podagra* of csg. 759 and *Antidotum podagricum* of csg. 751, both provide instructions for a potion involving birthwort, myrrh, laurel berries, and centaury (csg. 759 also includes cardamom and parsley) and claim that drinking this mixture for a year will cure the patient of gout.[8] The prevalence of *podagra* fits with the idea that the individuals most likely to have engaged with the manuscripts in which these recipes are recorded may have been at a higher risk of developing gout. Does the osteological evidence align with the textual record and confirm this picture?

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[6] Dietary rules were relaxed, for example, for the ill and elderly; see, for example, *RB 1980: The Rule of St. Benedict in Latin and English with Notes*, especially chapters 36-41; Kardong, *Saint Columban: His Life, Rule, and Legacy*, pp. 149-224, especially chapters 10 and 15.

[7] See Chapter 2 for more on the environments in which manuscripts were produced. On gynaecological texts in medieval medical writings, see Horden, 'What's Wrong with Early Medieval Medicine?', pp. 11-13; and on female medical practitioners within monastic contexts, see Green, 'Bodies, Gender, Health, Disease', pp. 13-14.

[8] Csg. 759, p. 60: *Potio ad podagra*; csg. 751, pp. 489-90: *Antidotum podagricum*.

Given the underlying assumptions about the potential users of these texts and their possible elevated risk factors for the disease, it is crucial to look beyond the written record to avoid a circular argument.

As will be seen below, my review of evidence for gout in early medieval skeletal remains provides a stark contrast to the rich textual record of *podagra*: osteological evidence for gout is almost entirely lacking in this period. A simple comparison of these two bodies of evidence suggests that the large number of *podagra*-related recipes would have been irrelevant to early medieval populations—can this disconnect be explained? I shall return to this question after analysing the skeletal and textual evidence for joint disease in other areas of the body. This more general study of joint disease provides a fuller picture of the arthropathies observed in early medieval skeletal remains as well as the treatments for joint pains and related problems recorded in the recipes. Informed by the wider context, it is then possible to revisit the gout-*podagra* paradox. I argue that the apparent incongruence between the textual and osteological evidence can be resolved by recalibrating our interpretation of the term *podagra*. Reading *podagra* as equivalent to a modern medical definition of gout inappropriately restricts our analysis of the Carolingian texts to a contemporary understanding of this disease and its effects. A broader interpretation of *podagra*, however, fits with the textual and osteological evidence. I therefore suggest that the term should be understood as referring to a collection of symptoms relating to toe and foot joint pain—such an interpretation could include true gout but is not restricted to this meaning alone. This re-evaluation of *podagra* has significant consequences for understanding and studying medieval medical terminology, reflecting the dangers inherent in taking medieval Latin medical vocabulary to mean a defined modern medical term. Secondly, the new interpretation of *podagra* has major implications for the question of applicability, indicating that, despite the initially conflicting evidence, many of the treatments recorded in the recipe collections would have been highly relevant to individuals in early medieval Europe.

I shall now begin with a review of *podagra* in the recipe literature.

The appearance of *podagra* in medical recipes

The textual evidence from eighth- and ninth-century recipe collections appears to support the idea that gout was a fairly common condition: 102 recipes out of the sample of 4335 recipes involved in this study claim to treat gout.[9] In other words, gout appears in over 2% of the total number of recipes analysed in this dissertation, suggesting that the condition was a pressing concern among those who compiled and had access to the texts. This prevalence fits with the aforementioned idea that those individuals, whether writing in a monastic scriptorium or active at the royal court, were most probably members of the elite and enjoyed a more privileged lifestyle associated with a number of the risk factors for gout.

As with the other case studies in Part 2 of this dissertation, I shall review recipes according to their specificity. Like Chapter 7, I have classified recipes that are intended to treat a wide range of unrelated conditions, such as antidotes that claim to cure diseases ranging from toothaches to snake bites, as non-specific and labelled recipes that treat a small number of conditions presenting potentially similar or related symptoms, such as remedies treating *podagra* and *artreticus* (arthritis), as semi-specific. I have categorised recipes that only refer to *podagra* as highly specific. With this analytical framework in place, I shall provide examples of recipes from each category and assess their distribution within the sample; the distribution of recipe specificity will be important to remember when comparing the case of *podagra* to other joint diseases later in this chapter.

I have classified fifty-two recipes as non-specific, representing 51.0% of the total number of recipes that mention *podagra* (see Table 8.1). *Podagra* and related terms appear frequently as one of the many conditions targeted by antidotes. The *Antidotum gera galieni fortissimo* of BAV pal. lat. 1088, for example, presents a list of just under fifty different conditions it is intended to cure, including epilepsy, paralysis, eye problems, gynaecological conditions, fevers, breathing problems, and

[9] This includes recipes using the terms *podagra*, *podagricis*, and related words or orthographic variations.

skin conditions; *podagricis* is the fourteenth condition listed.[10] Other examples of non-specific treatments include the *Antidotum gira deacoloquintidis* (noted in Chapter 4 for its use of camphor, *cafora*), also found in BAV pal. lat. 1088. This antidote offers a remedy to treat individuals suffering from approximately twenty-five different ailments, ranging from vertigo to liver pain; *podagricis* is the twenty-first item in the list.[11] Before describing the preparation of the antidote, the list ends with the claim that, in addition to curing present infirmities, the remedy will also defend against future ills. Likewise, the *Anteditum teodoritum* of csg. 759, offers another cure-all treatment, taking care of a host of different diseases while simultaneously repelling the onset of future maladies.[12] Again, *podagricis* can be found near the end of a list of roughly twenty-five specific conditions.

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[10] BAV pal. lat. 1088, f. 55[v]. Given the length of the antidote, I have only provided a transcription of the list of symptoms it claims to treat: *Antidotum gera galieni fortissima quae facit cefalargicis . scotomaticis epilempticis colericis melancolics fleumaticis quartanariis . stomacis emitritaicis ydropicis pleureticis . diaforeticis elefantiacis podagricis artritics siadicis disintericis ciriacis apoplecticis paraliticis et qui maniam patiuntur . ydrofobicis hictericis colicis epaticis spleniticis ambliopiasis litargicis nefreticis facit et ad oculorum passiones . idest semosin extenuat oculis uisum cerebro medetur auribus auditum prebet fauces et arteria purgat dentium dolorem conpescit renibus est ammirabilis mulieribus salubris uocem claram restitu et asmaticis et suspiriosis medetur et longinquas aegritudines sine mora curat . strumaticos sanat febres omnes auertit omnes malos dolores curat . lepras omnes per mundat cancros curat et siquis uenenum biberit omnia curat quae confectio prima est omnibus.*

[11] BAV pal. lat. 1088, f. 90[r]. Given the length of the antidote, I have only provided a transcription of the list of symptoms it claims to treat: *Antidotum . gira . deacoloquintidis . facit . ad uertiginem . et dolorem capitis . epilenticis qui subito angustia incurrit ad dolorem . pectoris et qui de nigra colera laborant pleoreticis et ad malas humores indegestibiles stomaticis . epaticis . et uentris dolorem colicis et qui longam egritudinem habent . eruginosis . et qui malam colorem habent neufetricis . et qui grauitudine corporum habent . idropicis et qui subito grauantur . tisicis . podagricis . incipientis mulieribus uitia . et corruptela uentris intrinsecas rupturas curat . sine molestia soluit . omni temporem . accipienda est . non solum presentes infirmitates curat . sed futuras egritudines defendit.*

[12] Csg. 759, p. 2. Given the length of the antidote, I have only provided a transcription of the list of symptoms it claims to treat: *Anteditum teodoritum ad omnia ut celissimo purgaturio qui facit ad dolorem capititis stomaticis epilemticis melancolicis maniaticis ad pectoris ad lateris dolorem ad malus humoris coniectus quibus esca acedis contra in estomacho ad tisecus ad eos qui reumaticas passionis patiuntur et ad eos qui in magrosia ueniunt hoc est in longa egritudinem ad hictericus ad itropicus ad reufriticus et qui graue corpus habent ad colum per hunc anteditum repletus et sane fiunt ad pedes plurimum dolentes ad incipientem dolore podagricis et mulieris aborsum et ad eos corruptillam uentris patiuntur uel stomacho*

Even among non-specific antidotes, however, there are varying degrees of specificity: the *Antidotum pigra gallieni optimum* and *Antidotum filantropum*, both of csg. 44, for example, claim to treat many fewer conditions, listing only about a dozen different diseases (including *podagra*).[13] While these antidotes may appear to be more specific due to the reduction in the number of diseases they intend to treat, the conditions listed in these remedies continue to represent a wide range of unrelated ailments, from stomach pain to epilepsy.[14] These simplified antidotes, therefore, represent abridged versions of the comprehensive remedies rather than more specialised treatments.

Table 8.1
Overview of the specificity of *podagra* recipes

Specificity	Non-specific	Semi-specific	Specific	Total
# of Recipes	52	15	35	102
% of total	51.0%	14.7%	34.3%	100%

In contrast to the non-specific recipes highlighted above, semi-specific treatments, such as the *Oxira podagricis* of csg. 751, claim to treat multiple, but more restricted, conditions. The *Oxira podagricis*, for example, is presented as a treatment for sufferers of gout as well as *omnem dolorem*, all pain. While still very broad, gout and *omnem dolorem* both fall under general pain management, and therefore represent one type of medical issue (admittedly very wide-ranging), rather than the entire spectrum of diseases listed in the panaceas.[15] As seen in Table 8.1, I have categorised

ad epaticus ad spleniticus soluit autem uentrem sine molestia acipiendum est uernum et autumnum uel statem simel aut bis non solum praesentibus curat egritudines sunt et futuris ad uenientis infirmitates repellit Siquis autem sanus usitauerit numquam infirmatur.

13 Csg. 44, p. 238.

14 The Antidotum pigra gallieni optimum begins by listing the following diseases: Qui facit stomaicis epilenticis melancolicis freneticis epaticis spleneticis podacricis uertigines caligines typus subito metus saltus membrorum neruorum contractiones per frictiones . et quod liber stupor uel mulieris uitia . et ad omnes causas quę subito ueniunt emendant. The Antidotum filantropum lists the following conditions: Facit tissicis dipnoicis cefalargicis stomaticis ad toraces limosotis dissolutis epaticis spleneticis colicis . aliis doloribus nefreticis podacricis (csg. 44, p. 238).

15 Csg. 751, p. 419.

fifteen recipes (14.7%) as semi-specific. An earlier remedy from csg. 751, the *Unguentum acupo galastico*, is even more targeted, intending to cure gouty or arthritic pains and swellings.[16] The *Malagma aduersus dolores fracturas et podagra ad luxum* of csg. 759, as its title suggests, treats pain from fractures, gout, and dislocations.[17] BAV pal. lat. 1088 offers a comparable treatment on f. 65v, the *Potio contra artreticam siue nesciam uel podagram*, intended to treat gout and arthritis.[18] While none of these remedies treats gout exclusively, each one targets a range of conditions that would have had somewhat similar symptoms, especially with regard to pain.

Finally, out of the 102 remedies that mention gout, I have classified thirty-five (34.3%) as highly specific to *podagra* (again, see Table 8.1). Csg. 44, for example, records the following recipe, *Ad podacra*:

> For gout: take equal measures of birthwort, centaury,
> and acacia powder and mix with cyclamen juice;
> apply this on [the toe].[19]

The *Potio ad podagra* of csg. 759 and *Antidotum podagricum* of csg. 751, the two Terenti(an)us recipes noted above, also fall into the specific category as they target *podagra* exclusively. Intriguingly, their recipes contain some parallels to the previous example, *Ad podacra*, with all three listing birthwort and centaury among their ingredients.[20] Csg. 751 presents another treatment with the same title forty-five pages earlier; this *Antidotum podacricum*, however, offers an unrelated recipe involving pepper, cumin, and ginger.[21] The recipe is particularly precise, adding the detail that it will help to reduce foot pain (*ad pedis dolorem sedatur*).

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16 Csg. 751, p. 319: Unguentum acupo galastico ad omnem dolorem uel tumorem tam podagricis quam artetricis.
17 Csg. 759, p. 63.
18 BAV pal. lat. 1088, f. 65v: Ad podacra: aristologia rotunda centauria agatia puluis ęquali pondere cum succu ciclaminis distemperas et super pone proficit.
19 Csg. 44, p. 260: Ad podacra aristologia rotunda centauria agatia puluis ęquali pondere cum succu ciclaminis distemperas et super pone proficit.
20 Csg. 759, p. 60: *Potio ad podagra*; csg. 751, pp. 489-90: *Antidotum podagricum*.
21 Csg. 751, p. 444: Antidotum podacricum ad pedis dolorem sedatur piper album . ~ viiii . filo armatico . viiii cimino ~ viii . gingiber . ~ viii . hermodictalus . ~ viiii . isiu idest

Having now reviewed recipes in which *podagra* is mentioned, the evidence for gout in the skeletal remains must be considered.

The absence of gout in archaeological contexts

In contrast to the prevalence of *podagra* in textual sources, osteological evidence for gout is extremely limited in this period: analyses of early medieval skeletal remains have produced very few examples of probable cases of gout. It is likely that preservation biases have contributed to the lack of evidence for this erosive arthropathy. Since the metatarsal-phalangeal joint at the base of the big toe is the most common and well-known site of an acute inflammatory gout attack, this is the most useful skeletal element to assess, but small bones, such as the phalanges, are more fragile and susceptible to decay. Male skeletal remains, however, tend to be found more often and in a better state of preservation due to both excavation biases and biological factors.[22] Since males are more predisposed to developing gout, these particular excavation and preservation biases work in our favour, offering a greater chance of recovering sufficiently preserved skeletal material from the individuals who would have been most likely to suffer from this condition. With this in mind, the relative absence of gout is striking.

It is important to note that a number of other conditions present similar destructive arthropathies on the bones of the feet, including leprosy, rheumatoid arthritis (RA), and osteomyelitis, but each have distinguishing features which, if there is sufficient preservation of skeletal material, would allow for a differential diagnosis.[23] RA and leprosy, for example, would typically present pathologies in other parts of the skeleton: RA tends to affect multiple joints in addition to the feet and toes, most notably the hands, while leprosy results in necrosis of the face and hands

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eoforbio ~ viiii . tundis cribras et reponis cum opus fuerit dabis cum aqua calida aut cum uino . ~ vii.

[22] For biases of preservation, see Roberts, *Human Remains in Archaeology* (see especially Chapter 3, 'Resting Places for the Dead, and Factors Affecting Preservation of Bodies').

[23] G. Baggieri and F. Mallegni, 'A Probable Case of Gout', *Medicina Historica*, 1 (2017), 23-8, pp. 25-7.

alongside the feet and toes. Therefore, it is possible that the actual incidence of gout is higher than reported, but, due to the state of preservation, such a specific diagnosis has not been given.

At present, probable cases of gout have only been identified among individuals buried at two early medieval sites within the Carolingian Empire, both in northern Italy (Cremona piazza Marconi and Bolgare), though additional cases have been recorded in both earlier and later periods as well as in other geographic areas, such as the British Isles.[24] The urban cemetery of Cremona piazza Marconi, in use from the seventh to the tenth centuries, contained 141 individuals, while the burial area in Bolgare, with over 400 individuals, represents one of the largest cemeteries ever discovered in Lombardy and was used in the seventh and eighth centuries.[25] The sheer size of these cemeteries may help to explain why gout was observed: given that the disease only affects one to four percent of the population today (a population with a diet relatively high in purines), a higher frequency of gout should not be expected in the past.[26]

However, while some of the palaeopathological reports used in this study focus on a small sample of individuals, other excavations uncovered large cemeteries comparable to Cremona and Bolgare and therefore might have been expected to include probable cases of gout. The burial area excavated at Santa Maria Assunta di Cairate, for example, produced ninety-two individuals, but no instances of gout were recorded, while the excavations at Mannheim-Seckenheim, a site in use from the sixth to the late eighth centuries, analysed 112 skeletons, and, again, no evidence of gout was reported.[27] Furthermore, many of the sites under consideration are thought to have

[24] Baggieri and Mallegni, 'A Probable Case of Gout', 23-8; J. Rogers, I. Watt, and P. Dieppe, 'Arthritis in Saxon and Mediaeval Skeletons', *British Medical Journal*, 283 (1981), 1668-70.
[25] Cattaneo and Mazzucchi, 'Popolazioni tardo antiche e dell'alto medioevo narrate dai resti ossei', pp. 87-98.
[26] Ragab, Elshahaly, and Bardin, 'Gout: An old disease in new perspective – A review', p. 496.
[27] V. Mariotti (ed.), *Un monastero nei secoli Santa Maria Assunta di Cairate: scavi e ricerche* (Mantua, 2014); D. Navitainuck, C. Meyer, and K. W. Alt, 'Degenerative Alterations of the Spine in an Early Mediaeval Population from Mannheim-Seckenheim, Germany', *HOMO – Journal of Comparative Human Biology*, 64 (2013), 179-89 and

contained elite burials, such as Lorsch (where separate burial areas for the monks, *familia* of the monastery, and possibly even pilgrims have been uncovered) and Campione d'Italia (which appeared to contain the remains of a privileged merchant family, the descendants of a certain Totone).[28] Overall, the lack of evidence for gout at many different sites around the Carolingian world, combined with its low frequency in large burial complexes, suggests that this disease was not a significant medical problem for many people during this period.

The absence of gout in the skeletal remains may seem puzzling given the relatively high frequency with which *podagra* is mentioned in medical recipes. Can the gap between the written sources and osteological record be reconciled? Or does the lack of overlap between these two bodies of evidence suggest that some of the medical knowledge circulating in the eighth and ninth centuries did not relate to the needs of contemporary individuals? I shall review the textual and osteological evidence for other joint diseases to build a more complete picture of arthropathies in the Carolingian world before returning to the gout-*podagra* paradox.

Moving beyond gout: Evidence for other arthropathies in the osteological record

Although gout is very rarely recorded in the osteological record, many other forms of arthritis are frequently noted. Indeed, joint diseases have been identified at all of the sites assessed in the present study. Before considering the skeletal evidence, an overview of these arthropathic conditions is necessary. First, joint diseases tend to be separated into two categories, proliferative and erosive, based on their pathology. Osteoarthritis (OA), the bony reaction to the degeneration of articular cartilage, is the 'archetypical proliferative joint disease' and the most commonly seen pathology

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Hansen and Alt, 'An Exceptional Case of Dental Calculus in a Merovingian Skeleton from Mannheim-Seckenheim', pp. 70-1.

[28] Kropp, Kirsch, Rosendahl, et al., *Begraben und Vergessen?* and personal communications with members of the scientific board of Lorsch, including Claus Kropp and Hermann Schefers; Blockley, Caimi, Caporusso, et al., 'Campione d'Italia. Scavi archeologici nella ex chiesa di San Zeno', pp. 29-80.

overall, often affecting the vertebrae, shoulders, hips, knees, ankles, and feet.[29] Gout represents a classic erosive arthropathy: well-defined round or oval erosions of the bone are caused by 'the precipitation of uric acid crystals in structures either in or around a joint', most frequently the metatarsal-phalangeal joint of the big toe.[30] Other erosive joint diseases include RA, psoriatic arthropathy, and ankylosing spondylitis. Like gout, these conditions only affect a small percentage of the total population and would therefore be expected to be found in archaeological contexts only relatively rarely. Unlike gout, however, descriptions of these diseases are fairly recent (no earlier than the seventeenth century) and their diagnostic features are not recorded in pre-modern texts.[31] With this in mind, I shall concentrate primarily on osteological evidence for OA.

Changes that occur on the surface of a bone as a result of OA include the formation of new bone, often seen as osteophytes (bone spurs); pitting on the surface of the joint; alterations of the joint contour, such as widening or flattening; and the development of an eburnated, highly polished area on the surface of the joint.[32] According to Tony Waldron, OA can only be said to be present if eburnation is apparent or if at least two of the other changes noted above exist.[33] It is necessary to take this fairly conservative approach to the diagnosis of OA since there can be a 'difference between skeletal appearances and clinical experiences', and palaeopathological analyses will lack information about pain as reported by a patient.[34] Similarly, when considering joint disease in the vertebrae, the development of Schmorl's nodes (protrusions formed as a result of damage to the vertebral endplate)

[29] T. Waldron, 'Joint Disease', in A. L. Grauer (ed.), *A Companion to Paleopathology* (Chichester, 2012), 513-30, p. 513; Waldron, *Palaeopathology*, pp. 24-71; A. Tosi, P. Badino, B. Pezzoni, 'Medical Conditions Observed in Osteoarchaeological Remains: Arthropathies, Traumatic Lesions, Tumours, Metabolic Diseases and Dental Pathologies', *Medicina Historica*, 1 (2017), 29-34, p. 30.
[30] Waldron, *Palaeopathology*, p. 68.
[31] Waldron, *Palaeopathology*, pp. 46-74; Waldron, 'Joint Disease', pp. 521-9.
[32] Waldron, *Palaeopathology*, pp. 27-8.
[33] Ibid, p. 33.
[34] Ibid, p. 31.

does not necessarily cause back pain.[35] Schmorl's nodes are, however, often linked to other spondyloarthropathies (joint diseases of the spine) and seen in association with bio-mechanical stress on the lower back.[36] Therefore, if evidence of these nodes is found in high frequencies *and* alongside other spinal pathologies, it can be assumed that the populations under consideration would have experienced back pain to some degree.

The development of OA is primarily linked to the aging process and the long-term wear on joints through daily activity, though metabolic and genetic factors as well as injuries, obesity, and sex also have an impact on the prevalence and severity of this pathology.[37] The natural effects of aging and physical activity, especially among populations involved in heavy labour, such as agricultural work, help to explain the pervasiveness of these conditions. I shall elaborate on the evidence for OA and joint stress in the following categories: 1) the spine, 2) large joints and limbs: shoulders, elbows, hips, and knees, and 3) small joints: hands and feet.

1. THE SPINE

The spine tends to be the area most frequently and severely affected by arthropathies in the palaeopathological reports consulted in this dissertation.[38] At the site of Mannheim-Seckenheim, 112 adults with largely complete and well-preserved spines were analysed. This sample yielded 2599 vertebrae and 106 sacral bones, allowing for a particularly detailed analysis.[39] Evidence of stress and arthritis of the

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[35] Waldron, *Palaeopathology*, p. 45; Tosi, Badino, Pezzoni, 'Medical Conditions Observed in Osteoarchaeological Remains', p. 30. See, too, the discussion on 'clinical correlation' in R. D. Jurmain and L. Kilgore, 'Skeletal Evidence of Osteoarthritis: A Palaeopathological Perspective', *Annals of the Rheumatic Diseases* 54 (1995), 443-50, p. 446.
[36] Ibid.
[37] Waldron, *Palaeopathology*, p. 28; Tosi, Badino, Pezzoni, 'Medical Conditions Observed in Osteoarchaeological Remains', pp. 29-30; A. Mattucci, C. Ravedoni, and E. Rettore, 'Analisi antropologica e paleopatologica della popolazione rinvenuta nel monastero dell'Assunta di Cairate', pp. 523-4.
[38] Mallegni, Bedini, Vitiello, et al., 'Su alcuni gruppi umani del territorio piemontese dal III-IV al XVIII secolo', pp. 233-61.
[39] Navitainuck, Meyer, and Alt, 'Degenerative Alterations of the Spine in an Early Mediaeval Population from Mannheim-Seckenheim, Germany', pp. 179-83.

spinal column was present in 111 individuals (99.1%) and the frequency and severity with which individuals were affected by arthritic changes increased with age.[40] Furthermore, nearly three-quarters (73.2%) of these individuals presented at least one vertebra with evidence of Schmorl's nodes.[41] While this site has recorded exceptionally high frequencies of OA and associated markers, it must be noted that, in many cases, these changes were not very severe. The high prevalence of spondyloarthritis within the Mannheim-Seckenheim sample may therefore be explained by their unusually good state of preservation; the authors of this report suggest that the lower frequencies of OA recorded at other sites is due to the less-well preserved skeletal remains in these contexts, though it must also be noted that the 112 skeletons analysed in this study represents only a sample of the total number of excavated remains.[42] Their interpretation, however, fits with the contrasting results from the site of Rivoli, La Perosa, a rural cemetery used from the sixth to eighth centuries in northern Italy.[43] At Rivoli, just under 10% of the sample of thirty-four adults presented evidence of joint diseases, and the authors of the study acknowledge that such a low incidence of joint disease is probably due to the poor state of preservation of the skeletons.[44]

Most sites report evidence of joint disease, and especially OA of the vertebrae, at frequencies between the two extremes of Mannheim-Seckenheim and Rivoli, often affecting approximately 30 to 40% of individuals. This intermediate level of joint disease is probably due in large part to the more moderate degree of preservation seen at many sites involved in this project. While the extremely good preservation seen at Mannheim-Seckenheim is uncommon, in-depth palaeopathological studies are rarely pursued when preservation is particularly poor. At Acqui Terme, Corso Roma, for example, a rural cemetery used from the seventh to ninth centuries, roughly 30% of

[40] Ibid.
[41] Ibid, p. 183.
[42] Ibid, p. 185.
[43] Mallegni, Bedini, Vitiello, et al., 'Su alcuni gruppi umani del territorio piemontese dal III-IV al XVIII secolo', pp. 233-61.
[44] Ibid.

the sample of twenty-nine adults presented evidence of joint disease, with spondyloarthritis the most commonly reported condition.[45] Similarly, of the ninety individuals uncovered at San Lorenzo di Quingentole, a rural church with a surrounding burial area dated to the eighth century, 38.4% exhibited signs of stress in their vertebrae.[46]

Although the vertebral column is almost universally the most severely affected area of the skeleton (the exceptional results from San Lorenzo di Quingentole will be discussed below), particular areas of the back are affected more or less severely at different sites. All of the adult males from Campione d'Italia (three individuals out of a group of eleven skeletons) present evidence of spinal arthritis, with the lumbar vertebrae the most affected area.[47] This contrasts with San Martino di Ovaro, a rural cemetery in use from the sixth to early eleventh centuries that included thirty-one individuals, thirteen of whom can be more precisely dated between the seventh and ninth centuries. The individuals dated to the Carolingian period exhibited a greater degree of degeneration in their thoracic vertebrae.[48] Not unlike the population from Mannheim-Seckenheim, spondyloarthropathies were seen in nearly all individuals. Certain patterns of wear are often related to particular activity patterns, working conditions, and walking surfaces, and therefore suggest that individuals at the various sites involved in this study experienced different lifestyles and engaged in a variety of activities, some of which stressed specific parts of the back more than others. Overall, however, it is evident that joint diseases of the spine were particularly prevalent in the populations sampled here. Given the diversity of sites under consideration, the relatively high frequencies with which these conditions are seen reflects the great

[45] Ibid.
[46] Dal Poz, Ricci, Reale, et al., 'Paleobiologia della popolazione altomedievale di San Lorenzo di Quingentole, Mantova', pp. 171-6.
[47] Blockley, Caimi, Caporusso, et al., 'Campione d'Italia. Scavi archeologici nella ex chiesa di San Zeno', pp. 56-8.
[48] V. Amoretti, 'Analisi paleobiologiche dei resti scheletrici', in A. Cagnana (ed.), *Lo scavo di San Martino di Ovaro (sec. V-XII). Archeologia della cristianizzazione nel territorio di Aquileia* (Mantua, 2011), 481-536.

extent to which individuals in early medieval Europe were affected by spondyloarthritis.

2. Large joints and limbs: Shoulders, elbows, hips, and knees

Although the spine is often the most frequently and severely affected area of the skeleton, there is extensive evidence for arthropathies in other joints. Regular physical activity engages the large joints of the shoulders, hips, knees, and elbows, leading to wear and tear over time. The intense physical labour associated with agricultural work, blacksmithing, horseback-riding, carrying heavy objects, etc., would put these joints under even more significant bio-mechanical stress. Indeed, the skeletal remains from early medieval cemeteries confirm the active living and working conditions experienced by most people during this period. For many individuals, this intense physical activity ultimately resulted in the development of arthropathies of the shoulders, hips, knees, and elbows.

As noted above, the excavation of San Lorenzo di Quingentole was exceptional in that the spine, though heavily affected by OA, was not the most severely affected part of the body: in this population, more evidence of arthropathies were reported in the shoulder.[49] Signs of stress were also recorded in the elbows and extremities, though the severity of stress decreased along the upper limbs.[50] That is, while the shoulder was the most acutely affected area of the body, evidence of joint disease in the elbows was not as severe and the hands even less so. In-depth analyses of the pathologies of several individuals at this site were highlighted as case studies. The skeleton buried in Tomb 33, for example, a male aged between forty and fifty years old, presented evidence of OA in the shoulders, hips, and knees based on eburnation and signs of bone formation.[51] Although the shoulders exhibited more signs of OA than the spine, the authors of the report do not interpret this atypical finding as suggestive of particularly unusual or distinctive labour, such as mining, but regard it as evidence of

[49] Dal Poz, Ricci, Reale, et al., 'Paleobiologia della popolazione altomedievale di San Lorenzo di Quingentole, Mantova', pp. 171-6.
[50] Ibid.
[51] Ibid.

fairly standard activities, such as agricultural work, wood chopping, or fishing. It is, however, noted that the heavy, clay-rich soil may have played a role in the accumulation of shoulder-stress in relation to agricultural activities and land reclamation.[52]

The excavation of the large, rural monastic cemetery at Santa Maria Assunta di Cairate, a site used over many centuries, produced over two hundred skeletons; the third phase of its use, dated between the sixth and ninth centuries, included ninety-two individuals. While the spine was the area most affected by OA, signs of arthritic changes were present on the bones of the shoulders, hips, and knees of many individuals.[53] Similarly, at Acqui Terme, three of the twenty-nine adults, over ten percent, had markers of OA in their hips; the sacroiliac joints of two individuals and coxofemoral joint of the third were particularly affected.[54] Looking to comparative sites beyond the Carolingian world, cemeteries from the British Isles provide a similar picture. Juliet Rogers, Iain Watt, and Paul Dieppe's early study of arthritis in medieval English skeletons, for example, revealed that 'hip and shoulder osteoarthritis were both common' in the seven cemeteries analysed.[55] Of the fifty skeletons dated to the early medieval period involved in their study, 24% presented evidence of advanced osteoarthritic changes in the shoulders and 28% in the hips.[56] Overall, the skeletal evidence indicates that OA was a common condition during this period, affecting not only the spine but also the large joints, and especially the shoulders and hips.

3. Small joints: Hands and feet

Although evidence for gout was very limited at the sites involved in this study, signs of OA in the small joints of the extremities have been noted in many reports. At

[52] Ibid.
[53] Mattucci, Ravedoni, and Rettore, 'Analisi antropologica e paleopatologica della popolazione rinvenuta nel monastero dell'Assunta di Cairate', pp. 523-4.
[54] Mallegni, Bedini, Vitiello, et al., 'Su alcuni gruppi umani del territorio piemontese dal III-IV al XVIII secolo', pp. 233-61.
[55] Rogers, Watt, and Dieppe, 'Arthritis in Saxon and Mediaeval Skeletons', p. 1669.
[56] Ibid.

Bolgare, for example, arthritis and foot problems were frequent: roughly 30% of the population exhibited small fractures in their feet and toes due to repeated microtraumas resulting from the accumulation of bio-mechanical stress and injuries.[57] Two males from Acqui Terme exhibited signs of OA in their feet: the left calcaneus and talus of one individual was particularly affected, while the phalanges of the right foot of the other individual recorded bony changes associated with the condition.[58] At Lorsch, an individual buried in the cemetery area associated with pilgrims and dated to the ninth or tenth centuries presented similar pathologies in his right ankle, including osteophytic growth around the calcaneus.[59] One of the three males from Campione d'Italia with spondyloarthritis also exhibited severe OA in his feet; this individual died at a relatively advanced age (fifty to sixty years old), fitting the severity of his arthritis.[60] As noted above, the excavation report of San Lorenzo di Quingentole concentrated on a handful of skeletons (out of the ninety-two excavated), providing detailed analyses of their pathologies.[61] One of these individuals, a male aged between forty and fifty, exhibited major signs of stress in a variety of joints: in addition to evidence of OA in the vertebrae, shoulder, elbow, hips, and knees, extensive osteophytic growth was observed in the ankles and roughness around the surfaces of these joints was reported.[62] These types of developments suggest that the affected individuals either experienced prolonged periods of walking or running and/or carried substantial weight resulting in significant stress on the ankles and feet.[63]

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[57] Cattaneo and Mazzucchi, 'Popolazioni tardo antiche e dell'alto medioevo narrate dai resti ossei', pp. 88-90.
[58] Mallegni, Bedini, Vitiello, et al., 'Su alcuni gruppi umani del territorio piemontese dal III-IV al XVIII secolo', pp. 233-61.
[59] Personal communications with Claus Kropp and unpublished notes from the 1990 excavation season at Lorsch.
[60] Blockley, Caimi, Caporusso, et al., 'Campione d'Italia. Scavi archeologici nella ex chiesa di San Zeno', pp. 54-5.
[61] Dal Poz, Ricci, Reale, et al., 'Paleobiologia della popolazione altomedievale di San Lorenzo di Quingentole, Mantova', pp. 151-95.
[62] Ibid, pp. 171-6.
[63] Ibid.

Arthropathies of the hands were less frequently recorded, though still noted at a number of sites. Individuals at Santa Maria Assunta di Cairate, for example, displayed evidence of OA in their hands.[64] At San Lorenzo di Quingentole, males exhibited significantly more stress in their hands than females.[65] Most notably, evidence of RA was recorded at Cremona piazza Marconi and possibly San Lorenzo di Desenzano, a rural cemetery with twenty-eight individuals dating from the seventh to eleventh centuries.[66] At the latter site, an arthropathy observed on the left ring finger of one individual could be due to RA or several other causes, such as trauma due to manual labour.[67] In contrast, the evidence from Cremona piazza Marconi is very convincing, in large part because it is seen repeatedly within the site and the onset of RA is strongly linked to genetic and environmental factors.[68] These two sites present the only possible examples of erosive arthropathies (in addition to the cases of gout noted above) identified within the sites under consideration.

The general trend seen in the skeletal evidence suggests that arthritis and minor traumas of the ankles, feet, toes, and, to a slightly lesser extent, hands, were widespread issues, affecting a sizable portion of the population. In contrast, evidence of erosive arthropathies was extremely limited.

4. Summary

The skeletal evidence reveals that joint disease affected a large proportion of the population. OA was the most prevalent condition reported, although possible cases of RA were also recorded at two sites. While the spinal column was almost always the most frequently affected area of the body, both large and small joints also exhibited

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64 Mattucci, Ravedoni, and Rettore, 'Analisi antropologica e paleopatologica della popolazione rinvenuta nel monastero dell'Assunta di Cairate', pp. 523-4.
65 Dal Poz, Ricci, Reale, et al., 'Paleobiologia della popolazione altomedievale di San Lorenzo di Quingentole, Mantova', pp. 171-6.
66 Waldron, *Palaeopathology*, pp. 46-53.
67 Canci, Chavarría Arnau, and Marinato, 'Il cimitero della chiesa altomedievale di San Lorenzo di Desenzano (BS)', pp. 452-5.
68 Cattaneo and Mazzucchi, 'Popolazioni tardo antiche e dell'alto medioevo narrate dai resti ossei', pp. 91-2.

signs of OA, testifying to active, physically demanding living conditions. Before reassessing the relationship between gout and *podagra* with respect to this evidence, the treatments recorded for other arthropathies must be surveyed to provide the full picture of joint disease as documented by the written record *and* preserved in the skeletal remains.

Textual evidence for joint disease beyond *podagra*

In some ways it is more challenging to address arthropathies in other joints since there is a less specific disease concept: we lack an equivalent of *podagra* for the vertebrae, shoulders, elbows, hips, and knees, for example. One partial exception is the term *artriticus*, defined by Isidore of Seville as 'an affliction of the joints' and explained as deriving from the word *articulus*, joint.[69] This is generally translated as 'arthritis' and will be the first topic explored below. On the other hand, the absence of a single term for pain and inflammation in other joints, and an associated, commonly accepted understanding (whether rightly or wrongly) of such a term, provides a greater flexibility when analysing the evidence. While problems of terminology and interpretation remain, there are fewer underlying assumptions to unpick, and examining the bigger picture with a more flexible interpretation of the medieval Latin has enabled me to re-evaluate the modern translation and understanding of *podagra*, as will be discussed in the final section.

In this analysis, I have considered recipes that claim to treat arthritis or pain associated with a particular joint, joints, or joint area. While this grouping is fairly loose, such broad criteria have made it possible to analyse a large number of the recipes within the sample that *might* have been intended to treat joint pain.[70] Consider, for

[69] Isidore of Seville, Isidori hispalensis episcopi: Etymologiarum sive originum, IV.vii.31: Artriticus morbus ab articulorum passione vocabulum sumpsit; translation from Isidore of Seville, The Etymologies of Isidore of Seville, trans. Barney, Lewis, Beach, and Berghof.
[70] It is impossible to be entirely comprehensive in this analysis given the differences in how individuals feel, understand, and describe pain (and its causes) between the Carolingian period and the present day. I have not, for example, included treatments for *omnem dolorem* (all pain) in this study as that seemed too broad, but it is, of course, possible that such a category of remedies was intended to treat pains due to arthritis.

example, the recipes titled *Ad ceruicis dolorem* and *Ad renum dolorem uel coxarum*.[71] The former is clearly intended for neck pain, so I have classified it as belonging to a treatment for a general 'joint area', the cervical spine. In contrast, the latter recipe claims to treat kidney and hip pain, a combination that raises the question, should the remedy be understood as a treatment for internal pains in the lower abdomen and pelvic region (including the kidneys, bladder, urinary tract, and so on) or a treatment for kidney pain as well as hip *joint* pain? The limited nature of the titles of recipes (and any additional details contained within them) rarely provides an answer in these types of cases, so I have categorised somewhat ambiguous recipes as joint treatments if they fit the criteria outlined above since they might have been intended for this purpose. Taking this into account, out of the sample of 4335 recipes, I have identified 117 recipes that could be interpreted as targeting joint diseases other than or in addition to *podagra*. As in previous recipe analyses, I have categorised these treatments by specificity, using the same parameters to divide them into non-specific, semi-specific, and highly specific groups (see Table 8.2). I have also analysed them by their target joint(s) or joint area (see Table 8.3). Studying this subset of remedies with respect to their specificity and target area has produced interesting results, often contrasting with the case study on *podagra*.

Table 8.2

Overview of the specificity of non-*podagra* recipes against joint pain

Specificity	Non-specific	Semi-specific	Specific	Total
# of Recipes	31	34	52	117
% of Total	26.5%	29.1%	44.4%	100%

[71] Examples of recipes entitled *Ad ceruicis dolorem* can be found in csg. 751, csg. 759, and BAV pal. lat. 1088 (and similar titles can be found in other manuscripts), while *Ad renum dolorem uel coxarum* is located in csg. 44.

Table 8.3
Number & percentage of non-*podagra* recipes by target area
(percentage = percent of the 117 non-podagra recipes)

a. *ARTRITICUS*

Total # of *Artriticus* recipes	*Artriticus* individually	*Artriticus* & *podagra*	*Artriticus* & *genu*	*Artriticus* & ≥ 2 other joints
62 53.0%	32 27.4%	24 20.5%	6 5.1%	4 3.4%

b. *CERVIX*

Total # of *Cervix* recipes	*Cervix* individually	*Cervix* & *scapulae*	*Cervix* & ≥ 2 other conditions
16 13.7%	10 8.6%	4 3.4%	2 1.7%

c. *SCAPULAE*

Total # of *Scapulae* recipes	*Scapulae* individually	*Scapulae* & *lumbus*	*Scapulae* & *cervix*
16 13.7%	11 9.4%	1 <1.0%	4 3.4%

d. *LUMBUS*

Total # of *Lumbus* recipes	*Lumbus* individually	*Lumbus* & *scapulae*	*Lumbus* & *coxa*	*Lumbus* & *podagra*
10 8.6%	5 4.3%	1 <1.0%	3 2.6%	1 <1.0%

e. *COXA*

Total # of *Coxa* recipes	*Coxa* individually	*Coxa* & *lumbus*
10 8.6%	7 6.0%	3 2.6%

f. *GENU*

Total # of *Genu* recipes	*Genu* individually	*Genu* & *artriticus*
9 7.7%	6 5.1%	3 2.6%

g. MULTIPLE TARGETS (≥ 3 joints/joint areas)

Total # of recipes
9 7.7%

1. General arthritis

I shall begin my review of non-gouty joint diseases with general treatments for arthritis. As noted above, Isidore of Seville mentions the terms *artriticus* and *articulus* in his *Etymologies*. Both of these words (and a variety of orthographic variants) appear in recipes as treatment targets at all levels of specificity and often in association with other joint diseases, including *podagra*.[72] In this discussion, I shall use the term 'arthritis' as shorthand to refer to recipes that mention either *artriticus* or problems affecting the *articuli*. In total, I identified sixty-two recipes that claim to treat arthritis, or 1.4% of the remedies involved in this study. Of these sixty-two recipes, I have categorised twenty-seven (43.5%) as non-specific panaceas, eighteen (29.1%) as semi-specific treatments targeting a range of similar conditions, and seventeen (27.4%) as highly specific recipes focused exclusively on arthritis (see Table 8.4). Like the analysis of *podagra*, non-specific recipes make up the largest category, but in contrast to the earlier study, the number of semi-specific and highly specific recipes is nearly identical.

Table 8.4

Artriticus recipes by specificity

Specificity	Non-specific	Semi-specific	Specific	Total
# of Recipes (% of Total)	27 (43.5%)	18 (29.1%)	17 (27.4%)	62 (100%)

By taking this analysis one step further and considering the specificity of treatments in relation to the different types of joint conditions paired with arthritis, a more nuanced picture emerges. In thirty-two of these cases, as shown in Table 8.3a, *artriticus* and *articulus* are the only joint-related terms mentioned. To clarify, this is not to say that these are all specific recipes, but recipes in which, no matter the total number of conditions they claim to treat, the only joint-related condition listed is arthritis. The number of recipes in this category, therefore, is nearly twice that of

[72] Csg. 751, p. 404.

specific recipes because although arthritis might be the only *joint* disease mentioned in some non-specific recipes, it is found alongside a host of other diseases, such as epilepsy, stomach pains, and skin conditions. On the other hand, just under half of the arthritis-related recipes (thirty) record other joint diseases alongside arthritis: *podagra* is included twenty-four times, knee problems are mentioned on six occasions, and four recipes list at least three different joints.[73] Of the twenty-four recipes that refer to both *artriticus* and *podagra*, fifteen (62.5%) are found in panaceas, whereas only nine (37.5%) are semi-specific treatments, such as the *Potio contra artreticam siue nesciam uel podagram* of BAV pal. lat. 1088 or the *Unguentum acupo galastico* of csg. 751, both noted above.[74] The four recipes that claim to treat a variety of joint pains present a similar picture: three are non-specific and one is semi-specific. Thus, when arthritis is paired with gout or listed alongside multiple joint problems, nearly two-thirds of the recipes (seventeen out of twenty-seven) are non-specific.

In contrast, when arthritis is the only joint-related condition mentioned in a recipe, over half (53.1%) of the treatments are highly specific, such as the *Unguentum ad artiticus* of BAV reg. lat. 1143 or *Gyma artreticis* of csg. 759.[75] Five recipes (15.6%) are semi-specific, including two examples of a remedy entitled *Catarticum artreticis ydropicis* intended to treat arthritis and dropsy, while ten (31.2%) are non-specific, such as the *Oxira crocira* of BAV pal. lat. 1088, which claims to cure over fifteen different conditions, including arthritis but also spleen, liver, and kidney problems, the bites of snakes and rabid dogs, and so on.[76] The ratio of these recipes'

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[73] This total (thirty-four) is higher than thirty because some of the multi-joint recipes list knees and *podagra* and have thus been highlighted more than once. This also explains why the percentages in Table 8.3a do not add up to 100%.
[74] BAV pal. lat. 1088, f. 65^{v}; csg. 751, p. 319.
[75] BAV reg. lat. 1143, f. 169^{r}; csg. 759, p. 61.
[76] The examples of the *Catarticum artreticis ydropicis* can be found in csg. 44 (p. 250) and csg. 759 (p. 58). For this example of the *Oxira crocira*, see BAV pal. lat. 1088, f. 60^{r}. My transcription of the list of conditions is as follows: *Oxira crocira facit epaticis spleneticis ad [i]\y/pocondria tensiones nefreticis ad omnem neruorum tensiones . pleureticis peripleumonicis artriticis sciaticis et omnem neruorum contractiones . et luxas et fracturas et incisos neruos soluit autem et omnes duritias et ad serpentium morsus et canis rabii morsum*.

specificity is the inverse of the *podagra* study, as illustrated in Table 8.1, where just over half of the recipes were non-specific and roughly a third were highly specific.

Turning to the recipes that pair knee pain and arthritis, all six treatments are semi-specific, referring to these two joint conditions exclusively. Consider, for example, the *Unguentum artitricis uel geniculorum dolorem* of csg. 751 and the *Unguentum ad febrientes* of BAV pal. lat. 1088, which although it may not appear to be a treatment for joint pain at first, adds the following phrase after its instructions for preparing the ointment: *similiter a genibus usque ad summum articulorum* ('likewise for knees and all joints').[77] Arthritis, thus, presents a complex picture: when it is the only joint condition recorded in a remedy, it is highly specific roughly half of the time, but non- or semi-specific otherwise. When paired with gout, it is entirely non- or semi-specific, but, in the handful of cases where the knees are the only other joint condition mentioned, it is quite targeted in its approach (despite being classified as semi-specific).

Looking at this another way, out of the 117 recipes that may target joint diseases other than or in addition to gout, thirty-one are non-specific and twenty-seven of the thirty-one (87.1%) involve arthritis. Significantly, this means that arthritis is mentioned in almost 90% of the non-specific remedies that treat joint disease other than or in addition to *podagra*. As seen in Table 8.2, I have classed thirty-four of the 117 recipes as semi-specific and fifty-two as specific. Arthritis is recorded in eighteen and seventeen recipes, respectively (52.9% and 32.7%), revealing a correlation between specificity and arthritis treatments: as specificity increases, references to a general joint condition, *artriticus*, decrease proportionally. There are still recipes that claim to target arthritis exclusively, but, in the wider context, *artriticus* appears more frequently in non- and semi-specific treatments.

[77] Csg. 751, p. 320; BAV pal. lat. 1088, f. 62^{r}.

2. Specific areas: Back, neck, shoulders, hips, and knees

The back, neck, shoulders, hips, and knees are mentioned as target areas in recipes on fifty-four occasions. Here, there is a striking contrast: only seven of the recipes (13%) can be classed as non-specific, while the remaining forty-seven recipes (87%) are semi-specific or highly specific treatments (see Table 8.5 for a full breakdown of each category's specificity). Of the semi-specific recipes, nearly all represent pairings of two particular joints or joint areas in proximity to each other, such the neck and shoulders or lower back and hips, indicating that, despite listing multiple areas, these are almost all very targeted treatments (though I have continued to class them as semi-specific recipes for the sake of consistency).

Of the four recipes that mention the neck and shoulders, for example, all focus on these two areas alone. BAV reg. lat. 1143 contains the recipe *Ad ceruices dolorem et scabule uel cuiscumque membra locum*, while csg. 751 includes a cluster of three recipes on p. 457 that target neck and back pain.[78] Three recipes mention only the back and hips and, again, the pairing appears to be linked. In csg. 751, a recipe on p. 461 for side pain (*Ad laterum dolore*) is followed by a second recipe that adds that it heals hip and back pain.[79] Similarly, a cluster of three remedies in BAV pal. lat. 1088 claims to treat back pains or hip and back pains: although listed under the title *Ad lumborum dolores*, it is then clarified that the recipes are for *lumborum uel coxarum dolores* (back or hip pains).[80]

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[78] BAV reg. lat. 1143, f. 198^{v}; csg. 751, p. 457. A recipe titled *Ad dolorem ceruicis* begins this cluster and is followed by the three remedies in question, the first of which is headed by *Item si escapulas doluerint* and the next two by *Item*.
[79] Csg. 751, p. 461: Item caulae cumbustae cum exungia lateribus uel coxis et lumbis ad positus mire sanat.
[80] BAV pal. lat. 1088, ff. 41^{r}-41^{v}.

Table 8.5

Non-*podagra* and non-*artriticus* recipes by specificity

a. Total number of recipes

Specificity	Non-Specific	Semi/Highly Specific	Total
# of Recipes	2	37	39
% of Total	5.1%	94.9%	100%

b. Neck

Specificity	Non-Specific	Semi/Highly Specific	Total
# of Recipes	0	10	10
% of Total	0%	100%	100%

c. Shoulders

Specificity	Non-Specific	Semi/Highly Specific	Total
# of Recipes	0	11	11
% of Total	0%	100%	100%

d. Back

Specificity	Non-Specific	Semi/Highly Specific	Total
# of Recipes	1	4	5
% of Total	20.0%	80.0%	100%

e. Hips

Specificity	Non-Specific	Semi/Highly Specific	Total
# of Recipes	1	6	7
% of Total	14.3%	85.7%	100%

f. Knees

Specificity	Non-Specific	Semi/Highly Specific	Total
# of Recipes	0	6	6
% of Total	0%	100%	100%

Considering these areas individually, nearly all recipes fall into the highly specific category, with the back, shoulders, and neck particularly notable in this regard, as seen in Table 8.5. Of the five recipes for back pain (i.e., where the back is the only joint area noted), four (80%) are highly specific (and all fall under the title *Ad lumborum dolores* in either csg. 44 or BAV pal. lat. 1088), while one, the *Remedium ad omnes tribulationes corporis* in csg. 44, is non-specific.[81] Treatments that mention the shoulders as the only joint area are even more specific: ten out of eleven recipes (90.9%) are highly specific. Several treatments for *Ad scapularum dolorem*, for example, can be found in csg. 44, csg. 751, csg. 759, BAV pal. lat. 1088, and BAV reg. lat. 1143 (with some orthographic variation between manuscripts).[82] The single semi-specific recipe, *Ad scapulas dolorem siue in quacumque parte coc<....> dolorem*, is recorded in csg. 751.[83] Finally, recipes that record neck problems as the only joint issue are the most consistently specific: all ten examples are exclusively intended to treat neck pain. Recipes with titles such as *Ad dolorem ceruicis* or *Ad ceruicis dolorem* can also be found in: csg. 44, csg. 751, csg. 759, BAV pal. lat. 1088, and BAV reg. lat. 1143.[84] In two manuscripts, BAV pal. lat. 1088 and csg. 44, the individual neck and shoulder recipes are associated with each other, with the shoulder treatments following the neck remedies.[85]

Therefore, although there are fewer recipes for each of these target areas, when viewed together they indicate that treatments for named joints were often highly specific and intended exclusively for that single joint/joint area, rather than as part of a wide-ranging panacea. Indeed, of the thirty-one non-specific treatments in the sample of 117 recipes reviewed above, only two mention an individual joint/joint area: back pain is listed in an antidote in csg. 44, while a panacea in BAV reg. lat. 1143 refers to hip pain.[86] At the other end of the spectrum, over two-thirds of the recipes categorised

[81] Csg. 44, pp. 345-6, 367; BAV pal. lat. 1088, f 41r (the example in BAV pal. lat. 1088 is the original recipe of the hip and back cluster noted above).
[82] Csg. 44, pp. 361-2, csg. 751, p. 433, csg. 759, p. 49, BAV pal. lat. 1088, ff. 35v-36r, and BAV reg. lat. 1143, f. 103v.
[83] Csg. 751, p. 431.
[84] Csg. 44, p. 361, csg. 751, pp. 457, 490, csg. 759, p. 48, BAV pal. lat. 1088, f. 35v, and BAV reg. lat. 1143, ff. 198r-198v.
[85] See chapter 5 for a discussion of the links between the recipe collections in BAV pal. lat. 1088 and csg. 44.
[86] Csg. 44, pp. 345-6: **Remedium ad omnes tribulationes corporis**; BAV reg. lat. 1143, ff. 161v-162v, Antidotus policristus.

as highly specific (thirty-five out of fifty-two), concern an individual joint or joint area, while the seventeen remaining recipes (32.7%) target arthritis more generally. These remedies and their contexts will now be reconsidered in light of the skeletal evidence presented above, making possible a re-evaluation of the conflicting evidence for *podagra* and gout as well as an assessment of the potential applicability of these treatments to individuals in early medieval Europe.

Integrating the evidence: A return to the gout-*podagra* paradox and the question of applicability

Having now analysed the textual evidence for joint pain in a variety of joints and examined the skeletal evidence for joint diseases in early medieval populations, it is possible to return to the opening case study. Investigating the wider context provides a more complete picture, enabling a reappraisal of the gout-*podagra* paradox. Crucially, this new perspective is less restricted by modern understandings of the conditions in question due to the more flexible terminology used to describe problems with other joints. After re-evaluating the relationship between gout and *podagra*, I shall return to the question of applicability and interpret the results with respect to all of the joint/joint areas considered in this chapter.

1. GOUT VS. *PODAGRA*: CONFLICTING EVIDENCE OR A MODERN MISTRANSLATION?

This chapter's opening study presented conflicting evidence: *podagra* was well-represented by textual sources yet gout was nearly invisible in the osteological record. Does this disjuncture indicate that the medical recipes circulating in Carolingian manuscripts were, at least in some cases, irrelevant to the populations who possessed them? As cautioned in Chapter 6, we should not simply jump to that conclusion based on the absence of osteological evidence since there are many reasons why probable cases of gout have not been observed. However, the fact that joint diseases in other parts of the skeleton are so frequently recorded suggests that the lack of evidence for gout may, in fact, reflect that it was not a common condition. Yet instead of reading the disparity between the two bodies of evidence as a sign that recipes claiming to treat gout were not widely applicable, I argue that, by considering the wider context, i.e., the evidence for arthropathies in other joints, a different conclusion can be drawn.

Traditionally, *podagra* has been translated as gout. However, based on this chapter's findings, I suggest that such a direct translation is inappropriate—are the texts really describing a *single* condition? If the interpretation of *podagra* is broadened to include more generalised toe and foot joint pain, the skeletal evidence and written record begin to align. Instead of understanding *podagra* exclusively as the modern medical definition of gout, a new interpretation of the term is needed, acknowledging that a) a modern diagnosis of gout relies on tests unavailable to medieval individuals (not to mention a wholly different understanding of the underlying causes of the disease), and b) their classification of pain in this region of the body is likely to have been less rigidly defined. I therefore suggest that *podagra* should be interpreted as general toe and foot joint pain that could include gout but also a range of other conditions presenting similar symptoms, such as OA, RA or even trauma. Indeed, the archaeological evidence suggests that effectively everyone who lived long enough would ultimately suffer from joint problems and pathologies in their lower extremities, much like modern populations. Remedies claiming to treat a cluster of related symptoms concerning toe and foot pain, listed under the umbrella term *podagra*, would have been applicable to many individuals.

As noted above, the recording of joint pain in other areas of the body, such as the neck or shoulders, was not limited by an existing term and its associated modern translation and definition, and the lack of such prescriptive terminology strongly influenced my re-evaluation of *podagra*. The prevalence of joint diseases in skeletal remains and the, at times, ambiguous nature of the textual evidence suggest that many of these treatments may have been intended for a range of conditions and pains, only some of which would be classified as arthritic today. Trauma, nerve pain, and other diseases can cause pain in all of the areas under consideration; joint pain due to the aging process and build-up of bio-mechanical stress is just one option, but one that must be considered given the extent of OA seen in the skeletal remains of individuals from this period. When applying this logic to *podagra*, it reveals that a direct translation is too restrictive and that a variety of similar aches and pains may have been classed under this term.

This more general understanding is further supported by the contexts in which the term *podagra* is found. Consider, for example, the recipes where the term is listed alongside somewhat comparable conditions, such as the pain of *artriticus* or even joint dislocations and broken bones as recorded in the *Malagma aduersus dolores uel fracturas et podagra ad luxum* of csg. 759.[87] Taking *podagra* to mean toe and foot joint pain, therefore, corresponds to more general pain management. The relatively large number of highly specific remedies also fits a broader understanding of *podagra*. The prevalence of foot and toe pathologies in the archaeological record suggests that remedies targeting pain in the lower extremities would always be in demand, used in an attempt to help those suffering from OA, RA, gout, and other conditions. To be clear, this argument for breadth is not to say that references to *podagra* could not represent gout. As cited above, earlier sources, such as Hippocrates and Galen, provided accounts of a condition that fit extremely well with a modern medical description of the symptoms, revealing that the disease was known as a distinct entity. Moreover, a handful of probable cases of gout have been identified in early medieval skeletal remains, indicating that remedies offering treatments for this disease would still have been applicable, if only to a very small number of individuals.

In addition to the semi-specific and highly specific examples considered above, gout is also seen in many non-specific panaceas. Panaceas, as seen in the examples above, tend to list a large number of 'set pieces', some of which are fairly generic (stomach pains, head pains, liver pains, etc.), but many of which are extreme (snake bites, rabid dog bites, epilepsy, paralysis, etc.). *Podagra*, if interpreted broadly, could fit the former type of general condition, or if taken to mean 'gout', falls into the latter category of rare and extreme diseases; *podagra* is thus part of the trope, one of the standard set pieces to include. Depending on how it is understood, the term could cover

[87] Csg. 759, p. 63: Malagma aduersus dolores uel fracturas et podagra ad luxum.

the entire spectrum of severity and/or urgency: on one hand, it could concern achy, arthritic joints (uncomfortable, but nothing out of the ordinary), while on the other hand, it could refer to true gout, an extraordinarily painful and debilitating condition.

Ultimately, while the prevalence of *podagra* in the texts contrasts with the general absence of gout in the skeletal remains, it does fit with the wider context: toe and foot joint pain would have been common issues. Moreover, contextualising remedies for *podagra* within their textual environment (i.e., observing the appearance of *podagra* in association with somewhat similar descriptions of foot, leg, and joint pain) supports a more general reading of the term. Therefore, by reassessing the written record in light of the osteological evidence in combination with in-depth textual analyses, I argue that we should interpret *podagra* more broadly, as a collection of symptoms rather than a specific, modern diagnosis. With this reframing of *podagra* and new understanding of how to interpret the term, it is possible to consider the original question of applicability with respect to the entire textual and osteological sample.

2. The question of applicability

The variety of recipe styles, and especially the range in specificity, demands an analysis of applicability at multiple levels. In particular, the divide between non-specific treatments and more targeted semi-specific or highly specific recipes must be considered separately. At first glance, non-specific panaceas may seem irrelevant, impractical, and inapplicable, and not simply based on their use of expensive, exotic ingredients (though this aspect was challenged in Chapter 4). Since these treatments lack a specific target, the question must be asked: would anyone seek to use such recipes? First, the cure-all approach seems not unlike certain modern 'home remedies', such as the heavy use of aspirin, ibuprofen, or even antibiotics to treat a range of conditions that may or may not respond to the selected drug. Moreover, their foreignness and the expense of the ingredients may have made these treatments particularly desirable: the higher the expense of the ingredients, the greater the perceived medical value. In fact, that antidotes such as the *Antidotum gira* *deacoloquintidis* of BAV pal. lat. 1088 incorporated exotic ingredients that were newly available in the west (in this case camphor) suggests that these complex remedies were not simply for show, but were actively integrating the latest pharmaceutical knowledge.[88] These features indicate that non-specific recipes may have been highly sought after, and the large number of panaceas in the literature must not, therefore, be automatically discounted as irrelevant to contemporary individuals.

The more specific recipes offer a different perspective on treatment. There is a high degree of overlap between the joints and joint areas highlighted in the textual analysis portion of this chapter and the areas of the body affected by OA, stress, and joint degeneration as recorded in skeletal remains. The archaeological evidence revealed that the back, including the cervical spine (i.e., the neck), often exhibited the most severe signs of arthritis, while the shoulders, hips, knees, elbows, feet, and hands were also greatly affected. Indeed, at Mannheim-Seckenheim, a site with particularly good preservation, over 99% of the analysed individuals presented signs of spinal degeneration and the frequency and severity with which individuals were affected by arthritic changes increased with age.[89] The skeletal evidence therefore suggests that the remedies intended to treat these specific joint areas, as well as general treatments for *artriticus*, would have been highly relevant to early medieval populations. Significantly, even burials at elite or monastic sites recorded evidence of arthritis and the accumulation of bio-mechanical stress, indicating that these conditions affected essentially everyone who lived long enough and not only those involved in tough agricultural labour or other physically demanding activities.

It is, however, interesting to note that foot- and toe-specific treatments are listed with much greater frequency than other joint-specific treatments. Consider, for example, that *podagra*-specific remedies are recorded thirty-five times, whereas highly specific neck treatments are only recorded ten times. Shoulder-specific remedies are also recorded on ten occasions, but other individual joints are listed even

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[88] BAV pal. lat. 1088, f. 90[r]. Again, see Chapter 4.

[89] Navitainuck, Meyer, and Alt, ‘Degenerative Alterations of the Spine in an Early Mediaeval Population from Mannheim-Seckenheim, Germany’, pp. 179-83.

less frequently. This may suggest that more general treatments for *artriticus* were sought after for arthritic pains in most joints while pains in the lower extremities were conceived of as a separate entity. Adding the seventeen arthritis-specific treatments to the numbers of each of the other individual joint treatments brings their totals more in line with *podagra*-specific remedies.

The overall picture, therefore, is one of applicability. The skeletal remains of early medieval individuals reveal that joint pain would have been an issue for many people, indicating that the remedies examined in this chapter would have been highly relevant to communities in Carolingian Europe.

Conclusion

Integrating evidence from the osteological record has produced a more nuanced understanding of the recipe literature, underlining the importance of being cautious in interpreting early medieval medical descriptions and deploying modern medical terminology. It is easy to fall into the trap of retrospective diagnosis, especially when a certain word has been consistently and unquestioningly translated as a modern medical term. Moreover, in the example of *podagra*, the automatic associations modern readers have with gout have tended to restrict medical historians to a contemporary definition of the condition, inappropriately applying a modern medical understanding to the past. Bringing the skeletal evidence to bear indicates that a careful, conservative approach to interpreting textual evidence is necessary. *Podagra* must not be automatically read as 'gout' as defined by modern medicine, but as a term that encompasses a wider collection of related symptoms—and which could still include gout. In other words, this chapter is not arguing that gout, as defined in modern medicine, did not exist, but that *podagra* should not be *equated* with this definition of gout. As historians, we must be open to understanding medieval medical terminology in a broader framework, considering how early medieval individuals would have categorised and described their aches and pains and thinking about symptoms rather than the definitions provided by modern disease labels.

This chapter indicates the importance of using the skeletal material to inform the reading of the recipe literature. If the remedies had been studied in isolation, the frequency to which *podagra* is referred could have been interpreted as a confirmation of the underlying assumptions about the prevalence of gout in potentially high risk early medieval populations, creating a circular argument. Similarly, given that other joints are recorded less frequently in remedies, a researcher working exclusively with textual evidence might have assumed that other arthropathies were less prevalent. Comparing the two sides of the story, the written record and the skeletal material, has thus helped to expose the true complexity of the situation, providing new insights into the health and lived experiences of individuals from the Carolingian period.

Chapter 9

Trauma and Surgery: Evidence of Undocumented Medical Practices?

Emplastrum qui sine ferro rumpit uulnera et
scrofas et aperit:
Salis ammoniaci liber i mollibdine liber i oleo liber
i cineris sarmentorum liber i femus columbino ~ iii
conficis et uteris.[1]

The title of the above recipe, a plaster intended to break open wounds and scrofulous swellings, includes a striking phrase: *sine ferro*, without iron. This topical application made of ammonia salts, galena, olive oil, the ashes of grape vines, and dove droppings claims to offer a non-surgical alternative to cutting into a wound or swelling. In a period before antibiotics and hygienic operating facilities, it is understandable that a substitute to surgical intervention would be sought. Whether such a plaster *would* rupture a swelling or open a wound is, of course, another matter and an investigation into the recipe's efficacy is beyond the scope of this dissertation.

In pre-modern medicine, dietary and pharmaceutical treatments were generally preferred to surgical intervention; in most cases, surgery would have been the last resort, turned to when non-invasive treatments had failed or if surgery was the only possible course of action, as might have been the case with traumatic injuries that occurred in battle.[2] The near total absence of early medieval surgical texts supports the idea that surgery was a rarity in this period, though exceptions, such as writings on bloodletting, cautery, and scarification, are recorded and will be addressed below. In

[1] Csg. 44, p. 243: Emplastrum qui sine ferro rumpit uulnera et scrofas et aperit salis ammoniaci liber . i . mollibdine liber i . oleo liber . i . cineris sarmentorum liber . i . femus columbino ~ iii . conficis et uteris.

[2] Mitchell, *Medicine in the Crusades*, p. 184. The topic of wounds received in battle will be considered in more detail below; for more on wounds generally in the medieval period, see L. Tracy and K. DeVries (eds), *Wounds and Wound Repair in Medieval Culture* (Leiden, 2015).

contrast to the early medieval evidence, treatises on more invasive surgeries did circulate in classical antiquity, the medieval Islamic world, and the later medieval west. However, just as the existence of dietary and pharmaceutical recipes is not, in itself, proof of their use in therapy, the inverse is true regarding surgery: the lack of surgical texts does not necessarily indicate that surgery did not occur during this period, but rather that, if surgical procedures were employed, knowledge of these practices was transmitted through non-textual means.[3] Yet the recording of a non-invasive alternative to surgical intervention, and, moreover, one that emphasises this very feature, suggests that, at least according to the textual record, surgery was to be avoided when possible. Do skeletal remains reveal signs of surgical practices unrecorded by the texts? Evidence of more general traumas must also be considered in both the written sources and osteological record to provide a wider comparative framework.

Trauma, in contrast to the conditions addressed in Chapters 7 and 8, is usually the immediate result of a sudden event, such as a fall or blow. This direct cause and effect relationship has given rise to a fairly consistent understanding of the aetiology of traumatic injuries from antiquity to the present day.[4] Despite this unusually high degree of consistency between the modern and medieval identification of the underlying mechanisms responsible for these types of pathologies, trauma remains a notoriously difficult concept to define. The *Oxford Medical Dictionary*, providing a modern clinical perspective, defines trauma as ‘a physical wound or injury, such as a fracture or blow’; this open-ended definition takes a wide range of potential pathologies into account.[5] Unlike the modern medical concept of trauma, there is neither a standardised definition of palaeotrauma nor an agreement on what it includes. Margaret Judd and Rebecca Redfern’s review of palaeopathology textbooks highlights

[3] D. Banham and C. Voth, ‘The Diagnosis and Treatment of Wounds in the Old English Medical Collections: Anglo-Saxon Surgery?’, in L. Tracy and K. DeVries, *Wounds and Wound Repair in Medieval Culture* (Leiden, 2015), 153-74.
[4] M. A. Judd and R. Redfern, ‘Trauma’, in A. L. Grauer, *A Companion to Paleopathology* (Chichester, 2012), 359-79, p. 359.
[5] E. A. Martin (ed.), *Concise Oxford Medical Dictionary* 5th edn (Oxford, 2000), p. 670.

'that considerable variation exists in what conditions are regarded as having a traumatic origin or association, reflecting both changes within the discipline as a whole and the development of forensic anthropology'.[6] Among the main areas of debate are whether to differentiate between trauma and treatment; how to classify certain pathologies that may result from trauma but may also stem from other causes, such as osteomyelitis or repetitive microtraumas; and whether to include body-modification, such as cranial deformation or foot binding, as trauma.[7]

Given the complexities of defining palaeotrauma and the variations seen within existing classification systems, this study will focus on a subset of pathologies that are typically understood within the context of trauma, including fractures, dislocations, and signs of surgical intervention.[8] An investigation into possible evidence for surgical procedures is inherently linked to signs of weapon injuries, falls, and other wounds and may provide indicators of the types of treatments that occurred during this period. This combination of foci thus directly relates to the chapter's principal questions.

This chapter will first analyse the recipe sample involved in this dissertation to establish whether the subset of pathologies delineated above are described in the written record. Although evidence for surgery is generally lacking, treatments for traumatic injuries are frequently recorded in the texts. While the subsequent review of osteological evidence does uncover a handful of examples of surgical intervention, the high degree of healing observed in more simple traumas, such as broken bones, reveals the existence of non-invasive medical care. Returning to the texts in light of the skeletal evidence, I argue that the non-invasive therapies they record were highly applicable to individuals in this period. It must be remembered, however, that the evidence for surgical intervention, though limited, indicates that medical knowledge was also transmitted through non-textual means during this period.

[6] Judd and Redfern, 'Trauma', p. 360.
[7] Ibid, pp. 359-62.
[8] While the inclusion of the latter category as a type of trauma has, as noted above, been debated, surgery is usually categorised as such.

Textual evidence for surgery and trauma

1. SURGERY

Given the ancient precedent of describing surgical procedures separately from pharmaceutical and dietary prescriptions, it might seem strange to look for evidence of surgery alongside recipes.[9] Yet the varied nature of MMCs blurs such neat distinctions: excerpts on minor invasive procedures, such as phlebotomy, cautery, and scarification, are found in these collections and are occasionally referred to in recipes as part of treatments. Moreover, many recipes describe treatments that would have been applied topically and, in the case of wounds or broken bones, may have involved bandaging, suggesting that the injury was protected and possibly even immobilised and/or splinted. Finally, Old English recipe collections offer an interesting parallel: a handful of surgical practices are recorded in these writings, such as the lancing and draining of an abscess or removal of gangrenous flesh.[10] It therefore seems possible that *if* surgical techniques were recorded in the Carolingian world, they could have been located within this textual environment, either mentioned in recipes as part of a treatment or found as a section within MMCs. This, however, is not the case: surgical procedures are not recorded in these contexts. These findings suggest that surgical knowledge, if passed on, was transferred through non-textual means, such as apprenticeships and oral traditions. Yet, intriguingly, I have not uncovered any other recipes that parallel the opening treatment's explicit avoidance of surgery. Exploring the broader category of trauma may offer insights into this situation and the relative silence on the topic of surgery.

2. TRAUMA

Despite the lack of references to surgery (either positively or negatively), traumatic injuries do appear with some frequency in the textual record. In the 4335-

[9] Skinner, 'Visible Prowess?: Reading Men's Head and Face Wounds in Early Medieval Europe to 1000 CE', p. 92.
[10] Banham and Voth, 'The Diagnosis and Treatment of Wounds in the Old English Medical Collections', pp. 154-6.

recipe sample, I have identified 110 recipes that claim to treat fractures (*fracturas*), dislocations (*luxus*), and/or injuries caused by a specific type of trauma, such as a blow (*plagas*), puncture (*punctas*), fall (*si homo de arbore uel de equo cediderit*), or named weapon (*sagittas*, *plagas quae a ferro incidetur*, etc.). Recipes that only included general terms for wounds, ulcers, and sores, such as *uulnera*, *ulcera*, or *uitia*, were excluded from the sample because they could not be directly linked to a traumatic injury. I also excluded treatments for animal bites and stings as well as the trauma of childbirth because signs of these injuries are often more difficult to see in the osteological evidence.

Table 9.1
Recipes that mention fractures and traumatic injuries

Specificity	Total	Non-specific	Semi-specific	Specific
# of Recipes	110	16	8	86
% of Total	100%	14.5%	7.3%	78.2%

As seen in Table 9.1, the majority of these recipes (78.2%) are highly specific, while non- and semi-specific recipes only account for sixteen (14.5%) and eight (7.3%) recipes, respectively. The non- and semi-specific categories follow the same criteria outlined in previous chapters. Regarding highly specific recipes, however, I have classified any recipes that only concern traumatic injuries as belonging to this category, even in cases where multiple types of trauma are mentioned, such as fractures *and* dislocations. I shall briefly review the non- and semi-specific recipes before concentrating on those that target trauma exclusively.

All sixteen of the non-specific recipes represent wide-ranging panaceas, with eight (50%) of these treatments corresponding to just two antidotes that reoccur in multiple manuscripts. The *Oxira crocira* is found in csg. 44, csg. 761, BAV pal. lat. 1088, and BAV reg. lat. 1143 and in each case the treatment claims to heal *luxum et fracturas* (the example in csg. 761 also adds *extrahit spinas*, to extract thorns) alongside a host of other maladies.[11] Similarly, the *Apostolicon* plaster is seen in four manuscripts (csg. 44, csg. 751, csg. 761, and BAV reg. lat. 1143) and consistently includes a phrase along the lines of *ad…plaga quae a ferro inciditur siue utres siue uitro siue canna sagittas educendas infixas corporis*.[12] The plaster is thus intended to treat wounds caused by cuts received from iron, glass, and other materials as well as arrows that have pierced the body and remain imbedded. The lengthy list of medical problems this plaster claims to treat then continues with the bites and stings of venomous animals before moving on to a range of other ailments, such as tumours, spleen problems, and neck pain. The non-specific recipes, as these two cases illustrate (and as has been noted in previous chapters), tend to treat a mixture of extreme and general medical issues; in this hybrid context, it is not surprising to see life-threatening wounds caused by traumatic injuries, such as arrows or sword blows, alongside serious and urgent (if also unusual) health problems, such as poisoning and snake bites.

The eight semi-specific recipes list traumatic injuries with or secondarily to other potentially related conditions. Four recipes, for example, mention fractures while also noting wounds, pains, and/or infections that *could* but do not necessarily stem from a traumatic event. As an example, csg. 751 records a remedy that claims to heal 'putrid shins' and all blows, *In christi nomine qui facit ad tibias putridas et ad omnes plagas sanandas*.[13] While the putrid shins could reflect an open, infected sore that developed as a result of trauma, this description also fits with haematogenous osteomyelitis and may therefore have no relation to a traumatic injury. Three recipes, such as the *Malagma aduersus dolores fracturas et podagra ad luxum* of csg. 759, include *podagra* alongside fractures and dislocations and, as elaborated in Chapter 8, may be linked to more general joint and/or pain treatments of the lower limbs. Given

[11] Csg. 44, pp. 243-4: *Oxira crucira empl<u>astrum</u>*; csg. 761, p. 59: *Oxyra crocira*; BAV pal. lat. 1088, f. 60r: *Oxira crocira*; and BAV reg. lat. 1143, ff. 172r-172v: *Oxyra grocira*.
[12] Csg. 44, pp. 238-9: *Apostolicon* (the Latin passage is from this recipe); csg. 751, pp. 423-4: *Emplastru<u>m</u> . apostolicon*; csg. 761, pp. 65-6: *Empl<u>astrum</u> . apostolicum*; and BAV reg. lat. 1143, ff. 133r-134r: ***Apostolicon***.
[13] Csg. 751, pp. 367-8.

the difficulties in interpreting what these recipes intend to treat, an analysis of the eighty-six specific recipes provides deeper insights into the topic of trauma.

As shown in Table 9.2, I have divided the highly specific recipes into two main categories: thirty-six recipes (41.9%) concern fractures and dislocations while forty-five (52.3%) mention a particular type of trauma, such as a blow or puncture. In addition to these categories, there are five recipes (5.81%) that mention both fractures/dislocations and a specific type of trauma. I have further divided the two primary categories into more specific subunits, also indicated in Table 9.2, based on the titles of each recipe and any additional information contained within them.

Table 9.2
Categories and subcategories of specific injuries

Category	Subcategory	Number	% of specific recipes (86)
Fractures and dislocations	Fractures	23	26.7%
	Dislocations	12	14.0%
	Fractures and dislocations	1	1.16%
	Total	36	41.9%
Named trauma	Blows	24	27.9%
	Punctures	18	20.9%
	Blows and punctures	1	1.16%
	Falls	2	2.33%
	Total	45	52.3%
Fractures/dislocations and named trauma		5	5.81%

Of the thirty-six specific recipes that are intended to treat fractures and dislocations, twenty-three (63.9%) mention fractures (see Table 9.3). Nineteen of these recipes represent general treatments for broken bones and can be found in csg. 44, csg. 751, csg. 759, and BAV pal. lat. 1088. Two of the entries in csg. 751 reveal the extent of variation seen among trauma treatments recorded in the texts: on the one hand, a remedy entitled *Ad osso fracto* recommends that the patient drink sulphur with wine and water for nine days, whereas the preparation *Ad ossa si fuerint fracta* provides instructions for applying a powder directly on the injury and, if the skin is broken, washing and bandaging.[14] In csg. 759, two recipes listed under the heading *Ad fracturas ossorum* also present multiple approaches: the first suggests both a topical application as well as a drink, while the second offers only a topical treatment.[15] The relatively large number of recipes offering different treatments for broken bones speaks to the diversity of information contained within these texts.

The remaining four recipes for fractures are even more specific in their aims: these are intended exclusively for cranial fractures. Two of these recipes, *De simplices uulneribus ad capitis fracturam* of BAV pal. lat. 1088 and *Ad capitis fractura* of csg. 751, appear to be derived from a treatment found in *De herba vettonica liber* based on their sole reliance on betony and nearly identical phrasing.[16] The other two recipes, both found in csg. 751, do not belong to this tradition: *Ad capitis fractura* offers fairly detailed instructions for the preparation of an ointment that contains exotic, aromatic ingredients, such as mastic and colophony resin, whereas *Ossa in capite si fracta fuerint* recommends a simple topical application made from agrimony and old lard.[17]

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[14] Csg. 751, p. 378: **Ad osso fracto** solfor bibat per die . viiii . terciam partem dinarium pinsantem ieiunus cum uino et aqua. Csg. 751, p. 432: Ad ossa si fuerint fracta in testa de pipinella [s]puluis facis super teola ex siccas et super puluere ponis si ret[e]\i/colus fuerit ruptus . lana de papiro super reticulo ponis et [a]\i/nde aceto et mel lauabis.

[15] Csg. 759, p. 52: Ad fracturas ossorum margile alba puluis liber . i . sal liber . ii . conmiscis cum aceto et album ouarum ponis super non soluis usque vii . dies et bibat uiola cum uino et piper et sal uiola; Item farina de faua miscis cum aceto et albumen de ouas et bolo et super ponis dies . vii . et ipsa pocione.

[16] BAV pal. lat. 1088, f. 44^{v}: De simplices uulneribus ad capitis fracuram uittonica contussa et super uulnus inposita mira celeritate gluttinat . eo qui de sanabis si tertio quoque die recentio rem frequentius in posueris donec sanescat etiam et ossa fractura extrahit; csg. 751, p. 408: **Ad capitis fractura** uerba uittonica contusa in capitę in plaga inpositam rase celeritate gluttinatur; Pseudo-Antonius Musa, De herba vettonica liber: Ad capitis fracturam: herba uettonica contuse et super capitis ictum inposita uulnus mira celeritate glutinatum sanabit; eo quidem efficacius, si tertio quoque die refectam, id est recentiorem, frequentius inposueris, donec sanat. Eius potestas tantam habere fertur utilitatem, ut ossa quoque fracta ui sua extrahat. See Chapter 5 for more on recipes related to De herba vettonica liber.

[17] Csg. 751, pp. 405-6: Ad capitis fractura In primo battę lardo et [(erased word)] de lino simul inpone et muta mane et sero si uideris ossa fractam diu inpone usque quod fractum

The skull is the only part of the body named in relation to fractures, a topic I shall revisit after reviewing the osteological evidence.

Table 9.3
Breakdown of specific recipes for fractures and dislocations

Category	Total	Fracture	Dislocation	Fracture & dislocation
# of recipes	36	23	12	1
% of 36 total recipes	100%	63.9%	33.3%	2.8%

As shown in Table 9.3, twelve recipes mention dislocations, representing one-third of the specific recipes in this category, and one recipe, the *Unguentum ad fractura uel luxatura* of csg. 759, targets both fractures and dislocations.[18] Recipes titled *Ad luxum* or *Ad luxatura* are found in csg. 44, 751, and 1396. Ankles are specifically mentioned in two recipes, *Ad talorem dolorem quis luxauerit ut dolor pausit* of csg. 759 and *Ad taloriem luxum* of csg. 1396, perhaps suggesting an ankle sprain.[19] Six of the recipes for dislocations also mention bruising; these are found as a cluster in BAV pal. lat. 1088 under the heading *Ad contussionem uel luxatura de praesenti* and all provide instructions for topical applications.[20] Over half of the dislocation recipes, therefore, specify additional details about the injury, such as bruising or naming the ankle as the area concerned. This contrasts with the fracture treatments, where the majority of recipes (nineteen out of twenty-three) did not supply further information about the fracture.

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fuerit eicias inde foris postea mittis mel aput carpia ad curandum deinde ad sanandum facias medicamen de cera et oleo et mel pauco resina de pino grano masticae et colofonia simul in unum misces et quoq\u/is uno corpore drapicello mundo in ledas et in plaga inpone; p. 437: Ossa in capite si fracta fuerint erba agrimonia contusa cum exungia ueteri fractis oponis solidat.

[18] Csg. 759, p. 75.

[19] Csg. 44, p. 348: ***Ad luxatura***; csg. 751, p. 405: *Ad luxum*, p. 440: *Ad luxum*; csg. 1396, p. 19: *Ad luxum*. Ankles: csg 759, p. 72 and csg. 1396, p. 16.

[20] BAV pal. lat. 1088, f. 45^{v}.

Forty-five recipes name a source of trauma that resulted in an injury. As seen in Table 9.4, I have grouped these treatments into four subcategories: recipes for wounds sustained by blows or strikes, puncture wounds, wounds caused by both blows and punctures, and injuries that occurred due to a fall. The majority of these recipes concern injuries related to weapons, such as sword blows or arrow wounds, or at least general physical violence (unspecified blows and strikes), while very few of the named traumas are related to non-violent incidents, such as falls or thorn punctures. It must be remembered, however, that a weapon injury does not necessarily indicate intentional violence but could have been the result of a hunting accident or even 'horseplay' as documented by the Annals of St. Bertin below.

Table 9.4
Breakdown of specific recipes that name a particular trauma

Category	Total	Blows	Punctures	Blows & punctures	Falls
# of recipes	45	24	18	1	2
% of 45 total recipes	100%	53.3%	40.0%	2.22%	4.44%

Twenty-four recipes mention blows, strikes, and cuts, totalling just over half of the named trauma recipes. Most of these treatments provide only general descriptions of the cause of the injury they intend to heal, using terms such as *plaga* or *percussum*. Csg. 751, for example, contains ten general treatments for *plagas*, BAV pal. lat. 1088 includes seven, and csg. 759 has a single entry.[21] Many of the recipes in csg. 751, such as the three entitled *Potio ad plaga*, provide instructions for producing a potion that would be drunk, though others, such as an entry contained within a small cluster of recipes on mandrake, *De mandragora*, suggest a topical application: 'grind up mandrake root and [combine it] with oil and apply on the wound; it heals wonderfully'.[22] While none of the ten recipes in csg. 751 is identical, a number of

[21] Csg. 751, pp. 39 (two cases), 392, 399, 405, 407, 410, 435, 451 (two cases); BAV pal. lat. 1088, ff. 44v-45r (six recipe cluster), 50v; and csg. 759, p. 71.

[22] Csg. 751, p. 392: Ipsa radice teris et de quoquis cum oleo et super plaga pone mirum sanat.

ingredients, such as agrimony, betony, and milfoil, are used repeatedly. In contrast to these herbal preparations that tend to use fairly common and potentially local ingredients, the recipe from BAV pal. lat. 1088, *Puluera ad plagam*, incorporates a range of aromatic, exotic, and mineral ingredients. Although the recipe provides no more guidance than 'use the powder', the inclusion of incense (*incensum*) suggests that this treatment may have involved fumigation.[23] In other cases, however, recipes supply more detail about the context of the injury and the treatment process. A cluster of five treatments in BAV pal. lat. 1088, for example, name 'iron implements' as the cause of the wound in question.[24] A recipe in csg. 759 recommends removing bone fragments before applying a powder, perhaps offering a hint of a surgical procedure but providing no clear evidence of this step in the treatment process.[25]

Puncture wounds alone are mentioned on eighteen occasions, as seen in Table 9.4. While nine of these recipes offer general treatments for punctures (*punctas*), one recipe in BAV pal. lat. 1088, titled *Ad eos qui cum toxicata sagittasi sunt*, is intended to treat wounds caused by poisoned arrows, and one recipe in csg. 751, *Si spina in pede uel in alico membro fuerit*, offers a cure for a foot (or any other body part) pierced by a thorn.[26] A cluster of three recipes in csg. 44 falls under the heading *Ad punctas qui latere super ueniunt* while a group of five recipes in BAV pal. lat. 1088 bears a very similar title, *Ad punctas que lateribus super ueniunt*.[27] The three recipes of csg. 44 do, in fact, parallel the first three recipes of those listed in BAV pal. lat. 1088; these two groups of entries belong to the two MMCs that were highlighted in Chapter 5. In

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[23] BAV pal. lat. 1088, f. 50^{v}: Puluera ad plagam assucandam et stringendam et celerius sanandam et carnem mortuam manducat . et confectio eius haec est mirra . \li/banum masticae colofonia pice nigra . Auropigmentum . bolorminum . galla . aloę . gipsu cornu ceruinu incensu . Aristolocia rotunda . Omnia aequis ponderibus trita cribata puluerem factum et cum opus fuerit uteris ad supra scriptas causas.
[24] BAV pal. lat. 1088, f. 44^{r}: Ad alia uulnera uel plagas ubicumque a fero aut quolibet.
[25] Csg. 759, p. 61: Puluis qui facit ad implire placas etiam et si ossa minuta habuerit excutit yrius ~ i . aristolotia longa ~ i . panacus rigius ~ i . mannis ~ iiii . omnia in puluerem redacta sic uteris. Notably, the recipe for cranial fractures in De herba vettonica liber and the recipe derived from it in BAV pal. lat. 1088 also mention extracting bone fragments, but there is not enough evidence to automatically link this with a surgical procedure, such as trepanation.
[26] BAV pal. lat. 1088, ff. 46^{v}-47^{r}; csg. 751, p. 396.
[27] Csg. 44, pp. 364-5; BAV pal. lat. 1088, ff. 39^{v}-40^{r}.

contrast, the recipe in csg. 759, *Remedium ad punctus*, appears to be totally unique and uses beer, suggesting that this may represent a treatment influenced by locally available products.[28]

The single example of a specific recipe that refers to both blows and punctures, *Medicamen mirabile ad placas ad sagita percusso*, is found in csg. 759.[29] Unlike most other subcategories, the majority of recipes that mention multiple forms of named trauma are non-specific recipes. The only other occasion where non-specific recipes predominate is the ‘fractures and dislocations’ subcategory, suggesting that antidotes, in their tendency to list particularly extreme medical problems, often include multiple weapon-based injuries rather than just an arrow wound *or* a sword blow.

Finally, recipes that mention falls are only recorded twice (see Table 9.4); these are particularly important to note as they are the only named sources of a traumatic injury, along with the thorn treatment, that do not necessarily suggest a violent act (whether intentional or accidental). These two recipes, entitled *Si homo de arbore uel de equo cediderit*, are found together in csg. 751.[30] The first provides instructions for a topical application and linen wrap, while the second produces a potion to drink.

The final category, recipes that mention both fractures and/or dislocations as well as a source of trauma, includes five specific treatments. Although two recipes from csg. 751 have titles that would suggest a single target, *Ad luxum* and *Potio ad plaga*, they contain additional information in the remedy itself. In the first, *Ad luxum* is written in red capitals and then followed by *ad luxum uel quolibet casum si percussum fuerit ut liuorem faciat*, a phrase revealing that the recipe is intended to treat not only dislocations but also bruising from a strike.[31] While this is similar to the dislocation recipes that mentioned bruising noted above, it is different in that it

[28] Csg. 759, p. 68: Remedium ad punctus lias de ceruisa recentis colas n[…]das et alio tando buter simul miscis et bibe dabis statim sanabitur. See Chapter 3 for more on beer in early medieval recipes.
[29] Csg. 759, p. 67.
[30] Csg. 751, p. 395: **Si homo de arbore uel de equo \cediderit/** recipis illa pastera sumen de illam aut de ebis teris cum aceto et albumen oua in linteo super pone; Item: sulfor bibat et mater erbarum bibat.
[31] Csg. 751, p. 400.

specifies that a blow, *percussum*, was involved. In contrast, a recipe from csg. 878 titled *Ad fracturam uel uulnera ferri* more clearly indicates the multipurpose nature of the treatment (see Figure 9.1) and offers the following preparation: 'For fractures or wounds from iron: barley flour, boar fat, and stinging nettle'.[32] Unusually, each of the ingredients in this recipe has been glossed in Old High German.[33] While vernacular glosses might suggest that this text was used in practice, these additions date to the eleventh century and therefore cannot be taken as evidence for this recipe's application in the Carolingian period.

Osteological evidence for trauma and surgery

1. IDENTIFYING AND UNDERSTANDING TRAUMA IN THE OSTEOLOGICAL RECORD

When assessing evidence of palaeotrauma, the nature of the wound and extent

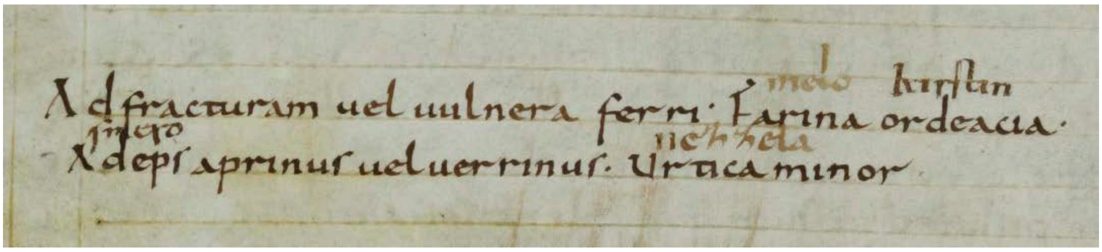
melo hirstan
Ad fracturam uel uulnera ferri. Farina ordeacia.
smero nezzela
Adeps aprinus uel uerrinus. Urtica minor

Figure 9.1: Ad fracturam uel uulnera ferri *(csg. 878, p. 333)*

of bone remodelling can provide important information about the traumatic process that caused the injury, whether medical intervention occurred, and whether the patient survived the incident. Fractures are the primary source of evidence for trauma in the skeletal record, though dislocations, especially of the shoulder, may also be observable in some cases. The type of break and its location on the body provide a framework for understanding the injury and may suggest whether the traumatic event was accidental or intentional.[34] A fall, for example, could result in a crush fracture (a fracture of a

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[32] Csg. 878, p. 333: Farina {melo} ordeacia {hirstan} Adeps {smero} aprinus uel uerrinus urtica minor {nezzela} (note: Old High German glosses are in brackets).

[33] For the glosses, see von Steinmeyer and Sievers, *Die althochdeutschen Glossen*, IV, p. 455.

[34] Tosi, Badino, and Pezzoni, 'Medical Conditions Observed in Osteoarchaeological Remains', *Medicina Historica*, 1 (2017), 29-34.

vertebra due to compression) or a Colles fracture (a fracture of the distal radius due to landing on an outstretched hand). A blow to the head often causes a depressed fracture (a fracture of the skull where the bone is forced inwards), whereas a strike to a long bone may result in a linear cutmark (due to a sharp, slicing weapon, such as a sword) or a transverse fracture (a fracture at right angles to the bone's long axis).[35]

Although the latter example, a transverse fracture, can be caused by many different types of trauma and should not be automatically interpreted as the result of interpersonal violence, the location of the injury can be instructive. Fractures that occur on the shaft of the radius and/or ulna, for example, are often referred to as 'parry fractures' since it is plausible 'that the individual was using his or her arm to ward off a blow aimed at the head'.[36] Yet despite the information provided by the injury's location and form, it must be remembered that the interpretation of the traumatic incident always remains a case of speculation.[37] While a 'parry fracture' is *suggestive* of an individual parrying a blow to the head, it is possible that this was not the case. It must also be remembered that some weapon-based injuries in the past may have also been accidental. The Annals of St. Bertin record, for example, that in the year 864 Charles, the grandson of Louis the Pious, 'was struck in the head with a sword by a youth named Albuin. The blow penetrated almost as far as the brain, reaching from his left temple to his right cheekbone and jaw', though 'he only meant to enjoy some horseplay with other young men of his own age'.[38]

[35] Waldron, *Palaeopathology*, pp. 139-41.
[36] Ibid, p. 151.
[37] For a discussion of the need for caution when interpreting signs of violence in the past (and examples of overzealous readings of the skeletal evidence), see M. R. Geldof, '"And describe the shapes of the dead": Making Sense of the Archaeology of Violence', in L. Tracy and K. DeVries (eds), *Wounds and Wound Repair in Medieval Culture* (Leiden, 2015), 57-80.
[38] Annales Bertiniani, s.a. 864, ed. G. Waitz, MGH SRG 5 (Hannover, 1883), p. 67: Carolus iuvenis…noctu rediens de venatione in silva Cotia iocari cum aliis iuvenibus et coaevis suis putans, operante diabolo ab Albuio iuvene in capite spathe percutitur pene usque ad cerebrum; translation from J. L. Nelson, The Annals of St Bertin (Manchester, 1991), pp. 111-12.

Figure 9.2*: Cutmark (J. Weber and A. Czarnetzki, 'Brief Communication: Neurotraumatological Aspects of Head Injuries Resulting from Sharp and Blunt Force in the Early Medieval Period of Southwestern Germany',* American Journal of Physical Anthropology*, 114 (2001), 352-6)*

Regardless of the potential intent behind an injury, it is often possible to interpret the context of fractures with some confidence: cranial injuries located in the left frontoparietal region suggest a 'face-to-face encounter' where 'the weapon inflicting these wounds [was] held in the right hand' (such as might have been expected in the encounter between Charles and Albuin).[39] Furthermore, when considering trauma due to weapons, the appearance of the fracture may offer insights into the type of weapon used. Swords or knives tend to leave a distinct cutmark, as seen in Figure 9.2, whereas a projectile, such as an arrow or spear, results in a small piercing or indentation, as illustrated in Figure 9.3.[40] Sticks, stones, maces, and other large items will typically result in a blunt force trauma, such as the depression fracture seen in Figure 9.4.[41]

[39] J. Weber and A. Czarnetzki, 'Brief Communication: Neurotraumatological Aspects of Head Injuries Resulting from Sharp and Blunt Force in the Early Medieval Period of Southwestern Germany', *American Journal of Physical Anthropology* 114 (2001), 352-6, p. 354.

[40] Tosi, Badino, and Pezzoni, 'Medical Conditions Observed in Osteoarchaeological Remains', p. 30; Weber and Czarnetzki, 'Neurotraumatological Aspects of Head Injuries Resulting from Sharp and Blunt Force in the Early Medieval Period of Southwestern Germany', p. 352.

[41] Tosi, Badino, and Pezzoni, 'Medical Conditions Observed in Osteoarchaeological Remains', p. 30; Weber and Czarnetzki, 'Neurotraumatological Aspects of Head Injuries Resulting from Sharp and Blunt Force in the Early Medieval Period of Southwestern Germany', p. 352.

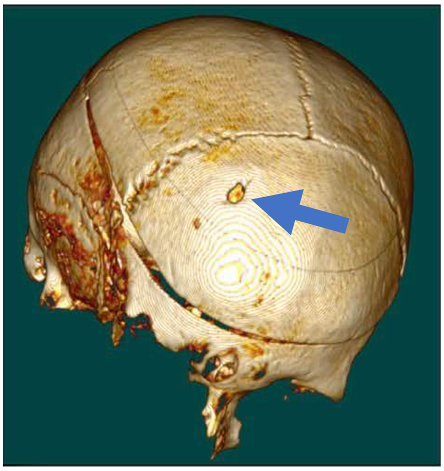

***Figure 9.3**: Indentation caused by a projectile (M. Licata, M. Borgo, G. Armocida, et al., 'New Paleoradiological Investigations of Ancient Human Remains from North West Lombardy Archaeological Excavations',* Skeletal Radiology *45 (2016), 323-31)*

The presence or absence (and, if present, extent) of remodelled bone at the site of injury can offer insights into the timing of the traumatic event and healing process. If there is no sign of remodelling, then the injury occurred at or very near to the individual's death.[42] In some cases, it can be difficult to distinguish between peri- and post-mortem trauma, though the fragmentation of bones due to soil weight or any damage incurred during the excavation process are often recognisable based on the appearance of the fracture edge.[43] If the individual survived the initial trauma, bone repair begins almost immediately (evidence of remodelling can be seen within roughly two days of the incident) and may continue for several years.[44] The gradation of remodelling seen at the site of injury can therefore provide a timeframe for understanding the healing process: did the individual make a full recovery or die within a few days or weeks after sustaining the trauma? If there are only early signs of bone repair, it suggests that the individual survived the initial traumatic incident but died relatively soon after, perhaps due to complications associated with the injury.[45]

[42] Tosi, Badino, and Pezzoni, 'Medical Conditions Observed in Osteoarchaeological Remains', p. 30.
[43] Waldron, *Palaeopathology*, p. 138; Tosi, Badino, and Pezzoni, 'Medical Conditions Observed in Osteoarchaeological Remains', p. 30.
[44] Waldron, *Palaeopathology*, p. 148.
[45] Ibid.

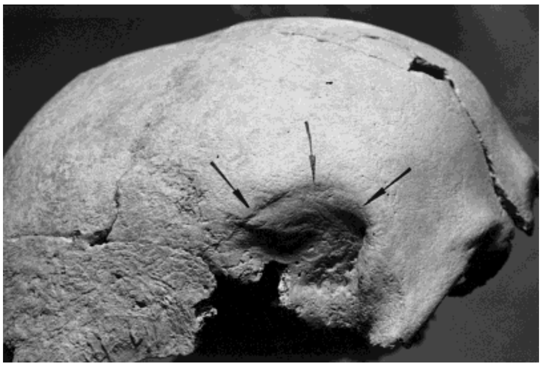

***Figure 9.4**: Depressed fracture due to blunt force (Weber and Czarnetzki, 'Neurotraumatological As-pects of Head Injuries Resulting from Sharp and Blunt Force in the Early Medieval Period of Southwestern Germany')*

When an individual survives the trauma, it may be possible to see evidence of treatment. The successful healing of a broken bone depends on immobilisation and, depending on the location and type of fracture, returning the bone to its normal anatomical position.[46] A number of complications may result if this does not occur, is done poorly, or the individual begins to use the injured bone before it is fully healed, such as non-union, shortening, and/or angulation.[47] Broken bones, and especially open fractures where the skin has also been broken, are susceptible to infection, and the development of osteomyelitis may be visible in the skeletal remains.[48] The complete remodelling of bone at the site of the injury would indicate that the individual survived for at least several years after the trauma occurred and suggests that some type of medical care was involved in their recovery. However, poorly healed fractures, such as those exhibiting a pseudoarthrosis, 'a fibrous joint formed between the broken ends of the bones' resulting from non-union, do not necessarily indicate that medical care was absent since this bone formation may have resulted from the use of the injured bone before healing was complete.[49]

Finally, the limits of osteological evidence must be remembered: skeletal remains will only record evidence of trauma that has affected the skeleton. Therefore, many forms of trauma will not be preserved in the archaeological record: while a sword blow might produce an obvious cutmark in a bone, a dagger might only pierce the soft tissue and leave no trace of the injury. The resulting underrepresentation of traumatic

[46] Ibid, p. 142.
[47] Ibid, p. 143.
[48] Ibid, pp. 143-4.
[49] Ibid, p. 144.

injuries in the skeletal record is therefore essential to keep in mind in the following review of skeletal evidence for trauma and surgery and will be revisited in the discussion that follows. Similarly, the lack of evidence for soft tissue trauma is also important to note in relation to the limited textual evidence for surgical intervention. Although, as mentioned above, surgery is rarely seen in the early medieval written record, there are three types of medical interventions that appear in the texts and could be classified as surgical: bloodletting, cautery, and scarification. Bloodletting appears most frequently and occurs in a variety of contexts. The *Plan of St Gall*, for example, includes a room in the medical area specifically labelled as the monastery's site for phlebotomy.[50] While the practice is occasionally mentioned in medical recipes, there are also writings dedicated exclusively to bloodletting, including calendrical texts that provide guidance on the best (or worst) days and times to phlebotomise as well as treatises on the subject itself.[51] Within the eighteen-manuscript sample involved in this dissertation, examples of calendars including guidance on phlebotomy can be seen in csg. 751 and 878, while Paris BnF lat. 11218, BAV reg. lat. 1143, csg. 44, csg. 217, and csg. 751 all contain versions of an *Epistula de phlebotomia*.[52] These types of superficial surgical procedures, however, will not be investigated in the present study since they only affect soft tissues and thus leave no skeletal indicators.

2. Evidence for trauma in early medieval skeletal remains

Although fractures, wounds, and other injuries appear less frequently than the oral pathologies and joint diseases addressed in previous chapters, a review of the early medieval skeletal record provides many examples of trauma. It is possible, moreover, to consider the types of traumatic incidents that caused these injuries and whether the

[50] Csg. 1092, the label reads: fleotomatis hic gustandum vel potionariis.
[51] For a list of texts on bloodletting, see Beccaria, *I Codici di medicina del periodo presalernitano*.
[52] Csg. 751, p. 428: untitled lunar calendar; csg. 878, pp. 366-7: *Conservatio fleotomiae et dies caniculares*. Paris BnF lat. 11218, ff. 34^{v}-37^{r}: *Epistola fleobotomie*; BAV reg. lat. 1143, ff. 94^{v}-96^{v}: *Epistola fleopotomiae*; csg. 44, pp. 191-4: *Epistula de phlebotomia*; csg. 217, pp. 252^{a}-252^{b}, 255^{a}-255^{b}; csg. 751, pp. 359-61: *Epistula de fleotomia gallieni*, pp. 455-6: *Epistula de phlebotomia*, and pp. 456-8: *Epistula de phlebotomia*.

individuals survived based on the criteria for assessing fractures outlined above, such as the type and location of the wound or degree of bone remodelling. The northern Italian site of San Martino di Ovaro, a cemetery containing thirty-one individuals, provided evidence of a variety of types of injuries, including fractures suggestive of both accidental traumas and intentional violence. Two individuals, for example, exhibited fractures of the radius, typical of a fall, whereas signs of a significant attack were observed on another skeleton.[53] The skull of this individual showed evidence of two major peri-mortem blows with a heavy cutting weapon (probably a sword), one across the jawbone and one from above.[54] Roughly a fifth of this population also exhibited signs of osteomyelitis, and while the development of an infection of the bone could stem from an open wound, it is possible that these cases resulted from an existing infection that spread haematogenously (i.e., through the bloodstream).[55]

At Acqui Terme, Corso Roma, a cemetery used from the seventh to ninth centuries containing thirty-three individuals, fractures were evident in three skeletons: one male and one female had ulnar fractures, while another individual had broken their fifth metatarsal.[56] Frustratingly, no further details were provided for these three fractures regarding the presence or absence of bone remodelling. While the authors' silence cannot be interpreted as evidence for the healing of these fractures, it does suggest that the injuries did not stand out as particularly unusual or noteworthy. In other words, it is unlikely that they presented obvious cases of non-union and consequent angulation or deformity. With respect to the ulnar fractures, it would have been helpful if the authors had provided more information about their location as this could suggest whether the injury might have resulted from parrying a blow to the head or falling on the arm. Periostitis, inflammation of the periosteum, was also recorded in

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[53] Amoretti, 'Analisi paleobiologiche dei resti scheletrici', pp. 513-15.
[54] Ibid.
[55] Aufderheide and Rodríguez-Martín, The Cambridge Encyclopedia of Human Paleopathology, p. 172.
[56] Mallegni, Bedini, Vitiello, et al., 'Su alcuni gruppi umani del territorio piemontese dal III-IV al XVIII secolo', pp. 233-61.

the humerus of one individual and can, like osteomyelitis, result from either an existing infection or an injury that became infected.[57]

Rivoli, La Perosa, another northern Italian site, likewise recorded a mixture of traumatic injuries. This cemetery, with burials dating from the sixth to eighth centuries, contained thirty-seven individuals.[58] A radial fracture was seen on one male, while cranial injuries were observed on a second male.[59] Although the fracture of the radius, like those from Acqui Terme, is not described in detail, the authors note that the fractured cranium showed no signs of remodelling and that this blow was almost certainly the direct cause of the individual's death.[60] In contrast, the traumatic injuries of a number of the individuals uncovered during restoration work at the Carolingian church of Sant'Agostino in Caravate have been studied in detail.[61] A 'small quadrangular perforation' was observed on the skull of one individual, a female aged approximately forty to fifty years old at death, and interpreted as the result of a blow from 'a pointed weapon with a pyramidal trunk head', such as an arrow (see Figure 9.3).[62] Bone remodelling was present at the site of the injury, indicating that this individual survived the incident.[63] A second individual, a male of roughly the same age, exhibited a fractured fibula, depressed cranial fracture, and deviated septum.

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[57] Mallegni, Bedini, Vitiello, et al., 'Su alcuni gruppi umani del territorio piemontese dal III-IV al XVIII secolo', pp. 233-61; Aufderheide and Rodríguez-Martín, *The Cambridge Encyclopedia of Human Paleopathology*, p. 179.

[58] Mallegni, Bedini, Vitiello, et al., 'Su alcuni gruppi umani del territorio piemontese dal III-IV al XVIII secolo', pp. 233-61.

[59] Ibid.

[60] Ibid.

[61] M. Licata, M. Ronga, P. Cherubino, and G. Armocida, 'Different Types of Traumatic Lesions on Mediaeval Skeletons from Archaeological Sites in Varese (North Italy): Diagnosis on *ante mortal* Fractures Using Macroscopic, Radiological and CT Analysis', *Injury* 45 (2014), 457-9; M. Licata, M. Borgo, G. Armocida, et al., 'New Paleoradiological Investigations of Ancient Human Remains from North West Lombardy Archaeological Excavations', *Skeletal Radiology* 45 (2016), 323-31.

[62] Licata, Ronga, Cherubino, and Armocida, 'Different Types of Traumatic Lesions on Mediaeval Skeletons from Archaeological Sites in Varese (North Italy)', p. 458; Licata, Borgo, Armocida, et al., 'New Paleoradiological Investigations of Ancient Human Remains from North West Lombardy Archaeological Excavations', p. 327.

[63] Licata, Ronga, Cherubino, and Armocida, 'Different Types of Traumatic Lesions on Mediaeval Skeletons from Archaeological Sites in Varese (North Italy)', p. 458.

While the direct cause of the fibular fracture is unclear, the depressed fracture was the result of blunt force trauma (see Figure 9.4); according to the authors, the deviated septum 'is probably the result of a traumatic event, but a congenital origin cannot be excluded'.[64] In the case of both fractures, complete bone remodelling was evident, revealing that the individual made a full recovery (at least in terms of the skeletal processes involved in healing).[65]

The three burial areas uncovered at the rural monastic site of Santa Maria Assunta di Cairate were in use from the late sixth to ninth centuries.[66] Relatively little trauma was recorded in the more privileged burial groups found within the church (Groups A and B), though it must be noted that the majority of these individuals were female and therefore may have been less likely to participate in the types of activities that tend to result in traumatic injuries, such as hunting or fighting.[67] One exception, however, stands out: a particularly tall female found in Tomb 29 in Group B (interpreted as an elite family unit) suffered a compound fracture of her left tibia.[68] Evidence of extensive bone remodelling is visible, suggesting that this individual lived for at least several years after the traumatic incident occurred. In contrast, many more injuries are observed in Group C, a collection of sixty-eight individuals thought to represent the general population who lived in the surrounding area during this period; fractures of the clavicle, ribs, ulna, and tibia were recorded.[69] Remodelled bone is apparent in these cases, indicating that the injured individuals survived the trauma and their fractures healed.[70] Evidence of periostitis was frequently recorded and especially

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64 Licata, Ronga, Cherubino, and Armocida, 'Different Types of Traumatic Lesions on Mediaeval Skeletons from Archaeological Sites in Varese (North Italy)', pp. 458-9; Licata, Borgo, Armocida, et al., New Paleoradiological Investigations of Ancient Human Remains from North West Lombardy Archaeological Excavations', pp. 458-9.
65 Ibid.
66 M. Motto, 'Sepolture nel monastero di Cairate: tipologia e organizzazione delle aree cimiteriali, uno sguardo di sintesi', in V. Mariotti (ed.), *Un monastero nei secoli Santa Maria Assunta di Cairate: scavi e ricerche* (Mantua, 2014), 501-17
67 Mattucci, Ravedoni, and Rettore, 'Analisi antropologica e paleopatologica della popolazione rinvenuta nel monastero dell'Assunta di Cairate', pp. 519-32.
68 Ibid, p. 523.
69 Ibid, pp. 521-3.
70 Ibid, p. 524.

in the bones of the lower limbs (the femur, tibia, and fibula).[71] Although it often remains unclear if this inflammation was due to an infected wound or the spread of an existing infection, in some cases, such as the female with the compound tibial fracture, the periosteal reaction can be convincingly linked to a traumatic injury.

A large-scale study of early medieval skeletons from Maastricht analysed 228 individuals dated from the fifth to tenth centuries. While this report both pre- and postdates the chronological boundaries of this dissertation, it does include the entire Carolingian period. In contrast to many of the sites reviewed above, where, despite relatively small sample sizes, traumatic injuries were generally observed on several individuals, the Maastricht study only contains seven examples of violent wounds, representing just three percent of the sample.[72] All of the reported injuries were due to sharp-edged weapons; one individual showed signs of multiple blows (to the skull, torso, and hand), while five had cranial fractures, and one exhibited a blow to the tibia.[73] In three cases, no evidence of bone remodelling was present, indicating that these were peri-mortem injuries and probably the cause of death.[74]

Both Cremona piazza Marconi, an urban cemetery in use from the seventh to tenth centuries, and Bolgare, a rural necropolis used in the seventh and eighth centuries, contain large skeletal assemblages, including nearly 150 and over 400 individuals, respectively. The combined report on these sites glosses over trauma, writing simply that the presence of traumatic injuries, such as radial fractures, suggests episodes of interpersonal violence or injuries derived from occupational activities.[75]

[71] Ibid, p. 523.
[72] R. G. A. M. Panhuysen, 'Het scherp van de snede: Sporen van geweld in vroegmiddeleeuws Maastricht', *Archeologie in Limburg* 92 (2002), 2-7; R. C. Woosnam-Savage and K. DeVries, 'Battle Trauma in Medieval Warfare: Wounds, Weapons and Armor', in L. Tracy and K. DeVries (eds), *Wounds and Wound Repair in Medieval Culture* (Leiden, 2015), 27-56, p. 35.
[73] Panhuysen, 'Het scherp van de snede: Sporen van geweld in vroegmiddeleeuws Maastricht', pp. 2-7; Woosnam-Savage and DeVries, 'Battle Trauma in Medieval Warfare', p. 35.
[74] Ibid.
[75] Cattaneo and Mazzucchi, 'Popolazioni tardo antiche e dell'alto medioevo narrate dai resti ossei', pp. 87-98.

The analysis of these skeletal remains does, however, focus on the lower limbs and notes that signs of trauma, unlike many of the other sites reviewed above, are most frequently seen in this area, though this prevalence appears to be linked to their broad definition of trauma.[76] Fractures and osteochondritis dissecans, a type of fracture 'caused by direct trauma or repetitive microtrauma', are recorded primarily on leg bones at Cremona, while small fractures due to repeated microtraumas are often seen on phalanges at Bolgare.[77] Overall, this evidence for lower limb and foot injuries, inclusive of microtraumas and signs of stress, relates more to joint disease and long-term processes of wear and tear (and was considered in Chapter 8) than to a sudden traumatic incident.

A somewhat similar combination of fractures and signs of stress was observed among adult males at San Cassiano.[78] The eight tombs found inside the church contained seven adult males and one child; although these burials, dated to the late sixth or seventh centuries, predate the Carolingian period, the evidence is interesting to compare to that seen at Cremona and Bolgare. In this case, however, the signs of trauma, both micro and macro, have been related to horseback-riding and the use of weapons. The legs, for example, revealed evidence of repeated stress linked to habitual horseback-riding, while the authors have suggested that the location and types of fractures observed within this small burial group are the result of falling off a horse.[79] These findings suggest that the males buried at San Cassiano represent a fairly elite group and contrasts with the pattern of leg fractures and stress indicators seen at Cremona and Bolgare, pathologies linked to labour that repeatedly over-loaded the back and legs, such as hard agricultural work and heavy lifting.[80]

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[76] Ibid.
[77] Cattaneo and Mazzucchi, 'Popolazioni tardo antiche e dell'alto medioevo narrate dai resti ossei', pp. 87-98; Waldron, *Palaeopathology*, pp. 153-4.
[78] Chavarría and Marinato, 'Frammentazione e complessità nelle practiche funerarie altomedievali in Italia settentrionale', pp. 61-8.
[79] Ibid.
[80] Chavarría and Marinato, 'Frammentazione e complessità nelle practiche funerarie altomedievali in Italia settentrionale', pp. 61-8; Cattaneo and Mazzucchi, 'Popolazioni tardo antiche e dell'alto medioevo narrate dai resti ossei', pp. 87-98.

Finally, Jochen Weber and Alfred Czarnetzki conducted a study of head injuries based on the skeletal remains from four early medieval cemeteries in southwestern Germany that were used from the sixth to the eighth centuries.[81] Thirty-three of the 304 skulls analysed (11%) exhibited cranial fractures, twenty-nine of which were judged to be male and four female.[82] Twenty-one skulls had linear fractures caused by a strike from a sharp-edged weapon, such as a sword, whereas depressed fractures due to blunt force were observed on nine skulls; three skulls show evidence of both types of fractures.[83] Of the twenty-one skulls with evidence of sword blows, six recorded multiple fractures, and in all six of these cases, no signs of bone remodelling were present, suggesting that these individuals probably died as a result of their injuries.[84] While two other skulls exhibiting sharp fractures also showed no signs of healing, some degree of bone remodelling was observed on the remaining twenty-five skulls.[85] In other words, over 75% of the skulls with cranial fractures survived the initial traumatic incident. Furthermore, three skulls exhibited signs of trepanation, 'the deliberate removal of pieces of bone from the skull', evidenced by scratching or cut marks around a circular opening, and, incredibly, all of these wounds showed signs of healing.[86] While the evidence of healed fractures at many sites speaks to some level of medical care, these three cases of trepanation also provide evidence of surgical intervention.

Comparative evidence from earlier sites in continental Europe as well as contemporary sites in the British Isles provide additional examples of surgery. Charlotte Roberts and Jacqueline McKinley, for example, highlighted nineteen cases

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[81] The cemeteries involved in this study are: Kirchheim/Ries, Neresheim, Nusplingen, and Schretzheim; Weber and Czarnetzki, 'Neurotraumatological Aspects of Head Injuries Resulting from Sharp and Blunt Force in the Early Medieval Period of Southwestern Germany', pp. 352-6.
[82] Ibid, p. 353.
[83] Ibid.
[84] Ibid.
[85] Ibid.
[86] Waldron, *Palaeopathology*, p. 161; Weber and Czarnetzki, 'Neurotraumatological Aspects of Head Injuries Resulting from Sharp and Blunt Force in the Early Medieval Period of Southwestern Germany', p. 353.

of trepanation in insular contexts from the fifth to ninth centuries, and more recent studies have identified further examples.[87] An excavation from Hemmaberg, Austria, has produced one of the most remarkable cases of early medieval surgery and medical intervention. Twenty-nine individuals dated to the sixth-century were found in a small cemetery associated with the early medieval church of St. Hemma and Dorothea; stratigraphic evidence combined with grave goods and burial customs 'place [these individuals] firmly within the Frankish cultural sphere'.[88] One of the skeletons, a male aged 35 to 50 years old at death, was missing the left foot and distal joints of the left tibia and fibula. While it might be assumed that this was due to poor preservation, the skeleton was otherwise well-preserved and the point where the tibia and fibula ended was marked by extensive bone remodelling.[89] Furthermore, 'a sub-circular iron band with a diameter of 6.8-7.3 cm' was found in place of the lower leg and foot, highly suggestive of a prosthetic attachment.[90] Ultimately, the osteological analysis of the tibia and fibula indicated that the foot and distal portion of the tibia and fibula had been surgically amputated and that, despite suffering from osteomyelitis, this individual eventually recovered: full remodelling of the bones indicates that the wound completely healed and the individual survived for at least some years after the surgery.[91] Although there is not enough evidence to deduce the cause of the amputation, the existence of this case of surgical intervention followed by long-term medical care (illustrated by the individual's survival of the initial surgery and the resulting infection as well as his use of a prosthetic lower leg after recovery) is

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[87] C. A. Roberts and J. McKinley, 'Review of Trepanations in British Antiquity Focusing on Funerary Context to Explain their Occurrence', in R. Arnott, S. Finger, and C. U. M. Smith, *Trepanation: History, Discovery, Theory* (Abingdon, 2003), 55-78; S. A. Mays, 'A Possible Case of Surgical Treatment of Cranial Blunt Force Injury from Medieval England', *International Journal of Osteoarchaeology* 16 (2006), 95-103.

[88] M. Binder, J. Eitler, J. Deutschmann, et al., 'Prosthetics in Antiquity—An Early Medieval Wearer of a Foot Prothesis (6th Century AD) from Hemmaberg/Austria', *International Journal of Paleopathology* 12 (2016), 29-40, pp. 30-1.

[89] Binder, Eitler, Deutschmann, et al., 'Prosthetics in Antiquity—An Early Medieval Wearer of a Foot Prothesis', pp. 31-2.

[90] Ibid, et al., p. 32.

[91] Ibid, pp. 33-9.

noteworthy, not least because this cemetery has been linked to an early Frankish context.

Overall, the above examples indicate that standard traumatic injuries, such as broken bones, were not infrequent; while some may have been caused by interpersonal violence, others could be due to accidents, such as a fall. There are, however, a number of more spectacular cases that document surgical invention, including the trepanations and amputation. Most significantly, the evidence of healing in many examples reflects effective (and often long-term) medical care.

Reading recipes in light of osteological evidence for trauma

The skeletal evidence presented above preserve signs of trauma from a variety of sources, including violent incidents involving weapons, probable accidental injuries resulting from falls or occupational hazards, and, rarely, examples of surgical intervention. Crucially, bone remodelling indicates that large numbers of early medieval individuals survived not only the initial trauma but also made full recoveries (at least in terms of the skeletal healing process); evidence of healed fractures is highly suggestive of medical care, even if this care remains otherwise invisible in the skeletal record. Although many of the examples of surgery listed above, such as the trepanations from early medieval England, are from sites beyond the Frankish Empire or, as in the case of the amputation, pre-date the Carolingian period, there are occasional signs of surgery in potentially Carolingian contexts, such as the examples of trepanations in southwest Germany which may date to the eighth century.

While the textual evidence records treatments for a similar range of traumatic injuries, there are no signs of trepanation, amputation, or other surgical procedures beyond superficial surgeries (such as bloodletting) or the possible cases of bone fragment removal. Reading recipes in light of the skeletal evidence thus indicates that although there is a large degree of overlap between the textual and osteological record, the written sources do not preserve evidence of certain complex medical procedures that were performed.

The second finding should not diminish the significant parallels observed between the osteological record and the recipes that mention fractures, dislocations, and various wounds inflicted by weapons, especially given that a) many of the examples of surgery are from beyond the chronological or geographic bounds of this dissertation, and b) signs of healing were observed in the osteological record with some frequency. The latter point is essential to consider when reassessing the recipe literature. Indeed, the parallels seen between the skeletal remains and the recorded treatments for traumatic injuries, including general traumas, such as fractures, and more specific injuries, such as wounds caused by particular weapons, suggest that much of the knowledge recorded within remedies was applicable to early medieval populations.

Moreover, the osteological evidence indicates that, at least in many cases, surgical intervention may not have been needed: immobilisation of the injured bone, reduction of inflammation, and pain management would have been the necessary course of action and this fits with the treatments offered by the recipes. Although I cannot begin to address the possible efficacy of these measures with regard to inflammation reduction or pain management, the large number of healed fractures in the skeletal record supports the possibility that these texts could have been used in practice. The inclusion of instructions for bandaging in some recipes suggests that these treatments could have been used in conjunction with knowledge passed on through alternative means, such as oral traditions, regarding bone setting or splinting techniques. The osteological evidence thus provides a useful balance to the written record. With this complementary evidence in mind, several areas of analysis can be pressed further in relation to the question of applicability.

1. Type of injury: Conflicting evidence?

Puncture wounds appear with some frequency in the recipe sample, with arrows (*sagittas*), thorns (*spinas*), and other non-specified punctures (*punctas*) mentioned on nearly twenty occasions. The skeletal remains, however, provide relatively little evidence of such injuries: the vast majority of weapon injuries appear to be linked to either sharp-edged weapons or blunt force trauma. The female skull with a probable arrow wound pictured in Figure 9.3 represents one of the few exceptions. Does this disjuncture suggest that the textual record, at least with respect to this type of injury, had little relevance to early medieval populations? While this could be the case, like the example of gout in the preceding chapter, the absence of evidence should not be read as evidence of absence and I argue against this simplistic interpretation. Instead, it is highly probable that the archaeological record provides a very skewed picture of puncture wounds because these types of injuries are much less likely to leave a trace of their impact on the skeletal remains. Consider, for example, a stab wound in the viscera or an arrow in the eye. Therefore, the medical texts' focus on puncture wounds should not be automatically dismissed as irrelevant despite lacking more cases of puncture wounds in the archaeological record.

Injuries that could be classified as 'non-violent', such as falls, present the opposite picture when comparing the two bodies of evidence. Among the recipes that named specific causes of traumatic injuries, over 95% listed a violent action or weapon as responsible for the wound in question.[92] The two recipes for falling off a horse or out of a tree and the treatment for a thorn represent the only exceptions. Surely falls and injuries from occupational hazards occurred more frequently than this record suggests, especially given that a selection of the skeletal remains exhibited evidence of horseback-riding. While this could represent a disconnect between the textual and archaeological evidence, I again argue that a deeper analysis of the texts reveals a different story. Unlike a puncture wound or a sword blow, which may need fairly specialised treatments, a fall could result in a broken bone, a dislocation, a sprain, major bruising, and so on. I suggest, therefore, that many of the recipes for general injuries, such as fractures, dislocations, and bruising, could apply to these types of 'non-violent' accidents. Given the varied nature of these injuries, it would be more appropriate to treat the specific issue with which the patient presents rather than 'a

[92] Although it must be remembered that some of these injuries may have been accidental, the method of inflicting damage (blows, strikes, cuts, etc.) can be described as violent.

fall'. With this in mind, the lack of recipes for falls and other nonviolent injuries makes much more sense and further strengthens the applicability of the general injury treatments.

2. Injury location: A case of strong overlap

As noted in the textual analysis, several parts of the body, including the head, were mentioned repeatedly. The texts' emphasis on this area fits with the archaeological evidence: cranial fractures were among the most frequently observed traumatic injuries in the skeletal record. Although the trepanations observed in the osteological record reveal that some surgical methods were used to treat head conditions (though it is unclear if the underlying cause(s) of a trepanation were related to trauma), many of the head injuries seen in the osteological record appeared to have healed as a result of non-invasive medical treatment. This adds further weight to the argument that the recipe literature was highly applicable to individuals in early medieval Europe.

3. The question of surgery

The topic of surgery deserves revisiting. Overall, the osteological evidence suggests that, while it did occur, it was employed relatively infrequently. While this fits with the idea that dietary and pharmaceutical treatments would be sought before surgery, the near total absence of surgical information in the texts is striking. Where did the individuals who performed these surgeries acquire their knowledge? Reflecting on the skeletal evidence, it is important to remember that the amputation/prothesis example as well as several trepanations occurred within a Frankish context. Although largely pre-dating the Carolingian period, these cases of surgical intervention offer a glimpse into earlier Frankish medical practices, suggesting that some knowledge of surgery, perhaps Frankish traditions or medical practices picked up through contact with the Roman military, was passed on through means distinct from the written record. Debby Banham and Christine Voth have argued that oral traditions and practical training may have played a significant role in the transmission of surgical knowledge in the insular world, and I suggest that continental Europe experienced a similar phenomenon.[93] This is not to say that *much* surgery was occurring during this period, but to acknowledge that the texts were certainly not the exclusive source of medical knowledge at this time.

4. Evidence for trauma beyond medical texts

Finally, a comment must be made on the wider context and the evidence for trauma as documented by textual sources beyond the medical manuscripts, such as capitularies, law codes, annals, histories, and poetry. Warfare represents perhaps the most obvious source of traumatic injuries recorded by non-medical texts. Einhard's *Life of Charlemagne*, for example, emphasised the brutality of the decades-long Saxon Wars, noting that Charlemagne would repeatedly 'avenge [the Saxon's] treachery and demand a fitting punishment until everyone who was accustomed to resist was crushed and brought back under control'.[94] In addition to territorial expansion and defence, internal conflicts, such as the civil wars of the early 840s fought between Charlemagne's grandsons, were another major source of violence. The Battle of Fontenoy (841) was famously memorialised by Angelbert, a follower of Lothar who survived the battle. While his verses do not provide details about the specific injuries sustained in battle, the general description of the death toll and suffering of survivors paints a vivid picture of the carnage: 'There has been no worse massacre on the field of battle. / Christian law is violated; blood flows in waves; / and in hell the maw of Cerberus opens with glee'.[95] Although such emotionally-charged lines may have an

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93 Banham and Voth, 'The Diagnosis and Treatment of Wounds in the Old English Medical Collections', pp. 153-74.

94 Einhard, *Vita Karoli Magni*, ed. O. Holder-Egger, *MGH SRG* 25 (Hanover, 1911). Translation from: Einhard, *Life of Charlemagne*, trans. D. Ganz, *Two lives of Charlemagne* (London, 2008), p. 23.

95 Angelbert, The Battle of Fontenoy, trans. P. Godman, Poetry of the Carolingian Renaissance (London, 1985), p. 263; Angelbert, Versus de bella quae fuit acta fontaneto, ed. E. Dümmler, MGH Poet. II (Berlin, 1884), p. 138: Cedes nulla peior fuit campo nec in Marcio. / Fracta est lex christianorum; sanguinis hic profluit / Unda manans; inferorum gaudet gula Cerberi.

element of dramatisation, it certainly suggests that much blood was shed. The epic *Waltharius*, despite presenting an even more theatrical perspective, offers depictions of hand-to-hand combat. When battling a series of Franks, the hero Walter killed Eleuthir by splitting his 'brain in two and, cutting through the neck itself, opened up his chest'.[96] Soon he 'turned his anger toward [Tanastus] and tore his shoulder from its joint and sliced through his side with iron, spilling his guts'.[97] Although the historical accuracy of the *Waltharius* cannot be taken at face value, its portrayal of the characters' attitudes towards violence and illustration of the types of trauma that might have been expected in combat provide a useful cultural framework in which to understand warfare and injury in the Carolingian period.[98]

Studies of Carolingian arms and armour based on documentary, iconographic, and archaeological evidence offer another perspective on the nature of the wounds sustained in battle. Simon Coupland's analysis of military equipment, for example, has confirmed the importance of mounted warfare and the use of lances, swords, and bows in battle.[99] Coupland also highlights that Carolingian swords were highly sought-after by the Franks' neighbours and that, despite the court's attempts to prevent them from falling into the wrong hands, 'archaeological evidence suggests that export embargoes were unsuccessful'.[100] Significantly for this discussion, the use of similar weapons across a range of contexts (internecine wars, borderland conflicts, Viking raids, etc.) would have resulted in comparable injuries. Despite this varied body of evidence on Carolingian warfare derived from literary, documentary, iconographic, or

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[96] Waltharius, trans. A. Ring (Leuven, 2016), pp. 124-5: Huic galeam findens cerebrum diffudit et ipsam / Cervicem resecans pectus patefecit, at aegrum.
[97] Waltharius, pp. 128-9: Hinc indignatus iram convertit in ipsum / Waltharius humerumque eius de cardine vellit / Perque latus ducto suffudit viscera ferro.
[98] J. M. Ziolkowski, 'Fighting Words: Wordplay and Swordplay in the *Waltharius*' in K. E. Olsen, A. Harbus, and T. Hofstra (eds), *Germanic Texts and Latin Models: Medieval Reconstructions* (Leuven, 2001), 29-51; J. M. Ziolkowski, 'Blood, Sweat, and Tears in the *Waltharius*', in G. Wieland, C. Ruff, and R. G. Artur (eds), *Insignis Sophiae Arcator: Medieval Latin Studies in Honour of Michael Herren on his 65th Birthday* (Turnhout, 2006), 149-64.
[99] S. Coupland, 'Carolingian Arms and Armour in the Ninth Century', *Viator* 21 (1990), 29-50.
[100] Coupland, 'Carolingian Arms and Armour in the Ninth Century', p. 44.

archaeological sources, our knowledge of the practice and practitioners of medicine in this context remains very limited. The extent of this lacuna is striking when compared to the surviving evidence for military medicine in classical and late antique Rome as well as later medieval Europe.[101]

Finally, the frequency with which the Carolingian rulers attempted to regulate violence beyond the battlefield reveals that traumatic injuries due to interpersonal violence could also occur outside of warfare. In the Capitulary of Herstal of 779, for example, counts and bishops acting as judges were prohibited 'from maiming men through hatred or ill-intent', while the *Admonitio generalis* of 789 banned revenge killings.[102] Notably, Charlemagne's capitularies specifically targeted eliminating violence in ecclesiastical communities on a number of occasions: pronouncements in 802 and 811 forbad the clergy from bearing arms and maintaining armed followers.[103] On the other hand, early medieval law codes shed light on the use of legitimised violence, such as corporal punishment. Take, for example, Rothair's Edict from the Lombard Kingdom from the middle of the seventh century.[104] While the majority of the 388 laws offer financial penalties, some present physical punishments, such as the amputation of a hand:

[101] On Roman military medicine, see, for example, I. Israelowich, 'Medical Care in the Roman Army during the High Empire', in W. V. Harris (ed.), *Popular Medicine in Graeco-Roman Antiquity: Explorations* (Leiden, 2016), 215-30. For medicine in the Crusades, see Mitchell, *Medicine in the Crusades*.

[102] W. C. Brown, *Violence in Medieval Europe* (Harlow, 2011), pp. 71-8; *Capitulare haristallense*, *MGH Cap.*, no. 20, c. 1, pp. 46-51; *Admonitio generalis*, *MGH Cap.*, no. 22, c. 8, pp. 52-62.

[103] Brown, Violence in Medieval Europe, p. 75; Capitula a sacerdotibus proposita, MGH Cap., no. 36, c. 18, pp. 105-7; Capitula missorum item speciale, MGH Cap., no. 35, c. 37, pp. 102-5; Capitula de causis cum episcopis et abbatibus tractandis, MGH Cap., no. 72, c. 4, pp. 162-4.

[104] *Leges Langobardorum*, ed. F. Bluhme, *MGH LL* 4 (Hanover, 1868); *Rothair's Edict*, trans. K. Fischer Drew, *The Lombard Laws* (Philadelphia, 1973); on early medieval law codes more generally, see K. Fischer Drew, *Law and Society in Early Medieval Europe: Studies in Legal History* (London, 1988).

> 242. Concerning the illegal minting of coins:
>
> He who mints gold or strikes money without the king's command shall have his hand cut off.
>
> 243. On forged charters:
>
> He who forges a charter or other kind of document shall have his hand cut off.[105]

An understanding of the wider Carolingian context in which violence occurred helps to situate the evidence of trauma preserved in the archaeological record as well as the recipe literature's approaches to traumatic injuries. The archaeological sites reviewed above do not appear to represent battlegrounds given that, although trauma was evident, it was not recorded in the majority of individuals, as might be the case with a mass grave of war-dead. Similarly, there is no evidence to suggest that the collections of recipes under consideration were written with either warfare or judicial punishments in mind. Instead, given the parallels seen in the osteological and textual evidence, I suggest that these collections would have been applicable to the day-to-day healthscapes of many individuals in early medieval Europe—not so relevant to those on military campaigns, but to those in, for example, a monastic community or an aristocratic household. The non-medical written sources, and especially Charlemagne's capitularies, indicate that violence occurred not simply on the battlefield but also in these environments (if at a lower level). This finding fits with the degree and frequency of injuries seen in the skeletal remains, though it must be remembered that some individuals may have survived the injuries they received in warfare and these wounds may account for some of the cases of trauma observed in the archaeological record. With this in mind, the types of recipes recorded in the medical texts appear to have been highly applicable to many individuals in the Carolingian world, offering basic treatments for traumatic injuries. Warfare, however,

[105] Leges Langobardorum, MGH LL 4, p. 60: 242: Si quis sine iussionem regis aurum figuraverit aut moneta confinxerit, manus ei incidatur; 243: De cartola falsa. Si quis cartolam falsam scripserit aut quodlibet membranum, manus ei incidatur. Translation from: Rothair's Edict, trans. K. Fischer Drew, p. 100.

represents violence on another level given the severity, urgency, and sheer number of injuries sustained in battle.[106] When entire limbs could be removed in a single blow, a topical plaster could only do so much.[107] I suggest, therefore, that the knowledge of military medicine, possibly including surgery, was primarily transmitted through non-textual sources, such as oral traditions.

Conclusion

Traumatic injuries, despite their seemingly straightforward cause-and-effect relationship, remain a challenging subject to investigate in past populations. This chapter has revealed that there is a fairly high degree of overlap between the textual evidence and skeletal record, especially with respect to fractures and wounds sustained from various types of blows. This suggests that much of the knowledge recorded in the texts was applicable to early medieval populations, at least in certain contexts—war, for example, would have presented trauma on a different scale and the treatments recorded in the recipe collections analysed in this dissertation would not have suited this environment.

Despite the general parallels between the two bodies of evidence, there were particular areas that seemed to present conflicting results, such as puncture wounds or non-violent traumatic injuries. Yet in-depth analyses of the evidence reveal that these more challenging topics do not conflict with the bigger picture: in both cases, contextualising the evidence resolves the issue. Surgery and warfare, however, remain special cases, reminding us that, although there is much evidence to support the use of these recipes in the practice of medicine, alternative sources of medical knowledge, such as oral traditions, were also relied upon during this period.

[106] Banham and Voth, 'The Diagnosis and Treatment of Wounds in the Old English Medical Collections', p. 169.
[107] As illustrated by Walter's attack on Gunther: Walter 'pried Gunther's shield away on the right, made a mighty and amazing blow, and tore off his leg up to the knee, all of it below the thigh' (*Impetit et scuto dextra de parte revulso / Ictum praevalidum ac mirandum fecit eique / Crus cum poplite adusque femur decerpserat omne*); trans. Ring, *Waltharius*, pp. 152-3.

Conclusion

Chapter 10
Putting Knowledge into Practice

In light of the evidence presented in the preceding chapters, it seems appropriate to return to the case of Terenti(an)us with which this dissertation opened and reconsider these two recipes, the *Antidotum podagricum* of csg. 751 and the *Potio ad podagra* of csg. 759.[1] These parallel recipes served as a useful entry point into the question of whether medical knowledge recorded in eighth- and ninth-century manuscripts was used *in* the practice of medicine given their inclusion of 'personal' comments: Terenti(an)us describes his experience of using this treatment. The shared nature of these comments, when considered with regard to their manuscript contexts, however, indicated that the two recipes were based on earlier material and therefore cannot be read as direct evidence for the use of these recipes in therapy in the Carolingian period. Most importantly, this example illustrated the ease with which such evidence can be over-interpreted when texts are analysed in isolation, highlighting the need for new approaches to the study of the relationship between medical knowledge and practice. What can now be said about the use of these recipes?

While it remains impossible to be certain if these particular treatments were consulted in the context of therapy, the evidence examined in this dissertation suggests that, overall, recipe literature was intended to be used in medical practice. Regarding the practicality of these treatments, their detailed instructions list a mixture of locally available ingredients, such as centaury (*centauria*) and birthwort (*aristolocia rotunda*), as well as exotic products, including myrrh (*mirra*) and cardamom (*cardamomo*, only listed in csg. 759). While supplies of such imported substances may have been limited, the evidence presented in Chapter 4 highlighted that these types of *exotica* were periodically available in the Frankish Empire. The recipes' applicability must also be considered. As shown in Chapter 8, few cases of gout have been recorded in skeletal remains dated to the Carolingian period. Yet the relatively high frequencies of more

[1] Csg. 751, pp. 489-90; csg. 759, p. 61.

general foot and ankle arthropathies suggests that treatments claiming to help *podagra* should be interpreted more broadly. If the Terenti(an)us recipes are therefore taken to address foot and toe joint pain, including osteoarthritis, rheumatoid arthritis, gout, and other diseases or injuries affecting the toes and feet, the treatments appear to be highly applicable. These findings thus reveal that the Terenti(an)us recipes were both practical and applicable and consequently support the idea that they were recorded with the intention of being used in practice. Such conclusions are only possible due to a) the analysis of a large sample of previously understudied recipe literature, and b) the combined investigation of the recipes' practicality and applicability.

I shall briefly review the conclusions from each of the preceding chapters before presenting a collective assessment of the results and their implications. I shall end by considering this dissertation's general contributions to the field.

Conclusions: Bringing together the case studies

While there is much evidence documenting the existence of medical practitioners in early medieval Europe, evidence for the use of medical texts *in* the practice of medicine is more elusive.[2] This dissertation has therefore aimed to investigate the relationship between medical knowledge and practice in the Carolingian world. Chapter 1 established the conceptual framework that underpins this study, using a historiographical review to situate the project, explain why it is necessary, and how it would be approached. A review of early work in the field revealed that many scholars worked on individual texts (or families of texts) in isolation and prioritised writings tied to classical and late antique traditions. The subsequent lack of scholarship on recipes unattributed to earlier sources demanded an analysis of this material. Simultaneously, the potential pitfalls of studying such texts in isolation, highlighted by the opening example of Terenti(an)us, resulted in the

[2] Flint, 'The Early Medieval Medicus, the Saint – and the Enchanter', pp. 127-45; Skinner, *Health and Medicine in Early Medieval Southern Italy*; Pilsworth, *Healthcare in Early Medieval Northern Italy*; and Pilsworth, 'Could you just sign this for me John? pp. 363-88; Park, 'Medicine and Society in Medieval Europe, 500-1500', pp. 67-9.

selection of an extensive sample: 4335 recipes from eighteen manuscripts. Although a revisionist wave of scholarship overturned many negative stereotypes concerning early medieval medicine, it also led to the generation (and repetition) of new assumptions concerning the use of medical texts. This dissertation's reassessment of the question of practicality is therefore a reaction to previous work that explored seemingly practical features in medical texts and the manuscripts in which they are located. Finally, this project's focus on the potential applicability of the recipe literature to individuals in early medieval Europe aimed to fill a significant gap in the field and builds on recent scholarship that has called for an investigation into past population health alongside traditional studies of the history of medicine.

Chapter 2 opened Part 1 with an introduction to the manuscripts consulted in this dissertation and the genre of writing under consideration, recipes unattributed to classical and late antique texts. This chapter laid the groundwork for the following three chapters that explored the question of practicality. Chapters 3 and 4 analysed ingredients listed in recipes, asking if these substances could have been obtained in the Frankish world during the eighth and ninth centuries. In Chapter 3, I examined the appearance of beer and mead (*medus*) in recipes. The appearance of these alcohols in eighth- and ninth-century recipes, when considered alongside evidence for the production of these beverages in the Frankish Empire, suggested that the scribes who composed these recipe collections incorporated ingredients suited to local conditions. I argued that the inclusion of these alcohols represents a practical addition to the recipe literature and indicates that scribes were actively engaging with this body of knowledge, updating it to rely on locally available ingredients. These features suggested that many recipes, at least with respect to these examples, were recorded with the intention of being used in therapy.

Chapter 4 came to similar conclusions, despite being based on an assessment of ingredients at the other end of the spectrum: exotics. By analysing the introduction of a cluster of ingredients from the east, tracing their inclusion in recipes individually, and considering evidence for the movement of these substances (in addition to the arrival of pharmaceutical information pertaining to them), I argued that recipes involving these *exotica* were also practical, if only rarely. The evidence indicates that the substances in question would have been available, but only sporadically, in small quantities, and at great expense. Recipes including these ingredients should not, therefore, be understood as practical in the same way as those considered in Chapter 3 (i.e., practical due to their localised production and resulting accessibility). Instead, I suggested that these recipes store 'latent knowledge', offering information that could be used when the ingredients were available. This may help to explain why there are so many different recipes that claim to treat the same symptom(s) or condition(s): each recipe provides a treatment option and could have been used depending on what ingredients were on hand. Based on these findings, I also argued that the inclusion of newly introduced exotics, like the addition of local products, revealed that scribes were adapting the recipe literature and incorporating 'cutting-edge' information. These modifications—that is, the addition of the latest pharmaceutical information—support the idea that this body of knowledge was intended to be used in the practice of medicine.

Chapter 5 moved from an examination of ingredients to an analysis of the wider recipe context. I investigated the appearance of a vernacular unit, the inclusion of instructions for substituting unavailable ingredients, and the composition of MMCs. Like the studies of ingredients, the use of the Latinised Germanic unit *staupus* and the addition of information on substituting *materia medica* represent two highly practical features that speak to the compilers' efforts at making this material user-friendly. By tracing the occurrence of recipes related to the late antique herbal *De herba vettonica liber*, I examined patterns relating to the process of compiling recipe collections and uncovered previously unknown links between two MMCs. The detailed breakdown of their indices and recipes suggested that these collections were based on an earlier exemplar but also incorporated new material. Paralleling the evidence from Chapters 3 and 4, this finding provides another window onto the editorial activities of Carolingian scriptoria.

Collectively, these three chapters connected different yet complementary perspectives on the practicality of the recipe literature. Based on this combination of evidence, I argue that many recipes were practical in terms of both design and use: they contain modifications that would have aided an individual consulting the texts and often present several treatment options that would have enabled someone to select a recipe based on their available ingredients.

Building on the assessment of practicality, I then turned to the question of applicability, re-evaluating the recipes in light of osteological evidence. Chapter 6 provided the foundation for the case studies of Chapters 7, 8, and 9, outlining the challenges of bringing together these two bodies of evidence and reviewing the sites involved in the following chapters.

Chapter 7's focus on dental disease exhibited many examples of overlap between the textual and osteological evidence. In other words, much of the information recorded by the recipes appeared to correspond to the conditions seen in the skeletal remains. I therefore argued that, with respect to dental health, the medical knowledge recorded in the recipe sample was highly applicable to individuals in early medieval Europe. Moreover, while a number of treatment subcategories, such as cosmetic dentifrices, may not have seemed so useful at first, a more detailed examination suggested that these treatments would have been particularly relevant to the individuals who likely had access to these texts.

Chapter 8 concentrated on joint diseases, opening the chapter with a study on gout. Although I identified many examples of recipes claiming to treat *podagra*, few cases of gout have been recorded in the osteological record. In contrast, the skeletal remains exhibited a high degree of general arthropathies, such as osteoarthritis. After reviewing recipes for more general joint disease in light of the osteological record, I reassessed the gout-*podagra* paradox and argued that the lack of correspondence between the evidence for gout and *podagra* can be resolved by broadening our interpretation of the term *podagra*. Understanding the medieval usage of *podagra* as more generalised arthritic foot pain instead of the modern medical definition aligns more closely with the osteological evidence, supports the applicability of these remedies, and reminds us of the dangers of applying modern medical definitions to medieval medical terms.

Finally, Chapter 9 investigated surgical intervention and trauma. Given the lack of treatises on surgery in the early medieval west, this chapter assessed whether there is evidence to suggest that surgical practices unrecorded by written sources were being practised during this period. While signs of surgery, such as trepanation, were observed in skeletal remains, such invasive practices were very rare and, in general, the recipe literature exhibited a high degree of overlap with the osteological record. An examination of texts beyond the medical corpus, however, revealed that the skeletal evidence considered in this study did not appear to record the extremely severe injuries of warfare. Therefore, although the recipes analysed in this dissertation would not have suited the context of military medicine, it does appear that they would have been applicable in other settings, such as an aristocratic household or monastery.

While it must be remembered that each of these case studies represents a single type of condition, all three chapters provided evidence supporting the applicability of the recipe literature to individuals in early medieval Europe. Bringing the two parts of this dissertation together, it appears that a large proportion of these treatments were both practical and applicable, though a number of caveats remain. In particular, my claim that the recipe literature was largely practical and applicable should not be taken to mean that this body of knowledge was always and/or uniformly practical and applicable; rather, this material was practical and applicable given the appropriate circumstances. In other words, these recipes offer treatments that, though they might not have been consistently useful or usable, they record recipes that *could* have been used when an individual presented with Disease X or Injury Y and when Ingredient A, B, and C were available. Consider, for example, the injuries discussed in Chapter 9: the osteological evidence suggests that fractures were not a regular health problem but that they did occur. It would therefore make sense to have treatments ready to be deployed when such an accident happened, even if such injuries were relatively rare. Likewise, the frequency with which multiple treatment options were recorded suggests that a recipe could be selected on the basis of the available ingredients. Cynehard's complaints about his lack of *exotica* clearly illustrates that certain ingredients were difficult to source during this period. Yet many of these types of ingredients appear to have been occasionally available, if only in limited quantities and at a high price. A recipe incorporating such ingredients therefore stored knowledge that could be used but only in specific circumstances. With these caveats in mind, I argue that the recipe literature should be understood as 'latent knowledge': overall, these treatments could have been used if the appropriate situation presented itself and the necessary ingredients were available. On the basis of these findings, I shall now return to the question of whether these recipes were used in medical practice.

The implications of this dissertation's conclusions

When considering the environments in which manuscripts were produced, Chapter 2 briefly touched on the contexts in which medical writings might have been used. At that stage, I limited my comments, addressing the topic in order to distance my work from the problematic concept of *Mönchsmedizin*. Having now presented evidence for these recipes' practicality and applicability, it is possible to elaborate on this topic in more detail. Overall, I argue that my findings not only suggest that these recipes could have been used in practice of medicine but that they were *intended* to be used in this practice.

The consultation of such texts in the context of treatment does not preclude them from being used in other ways; the use of these recipes in therapy represents just one of the many ways they could have been used.[3] I therefore suggest that many of the recipes examined in this dissertation could have had multiple purposes: as guides in therapy, as teaching texts, as writings on natural history, and so on. Yet based on the evidence assembled in the preceding chapters, I argue that, in general, unattributed recipes, whether recorded as individual recipes or as part of MMCs, were written with the primary intention of being used in medical practice. It must be remembered, however, that a) a single text could have enjoyed multiple, overlapping uses, b) the ways in which recipes or recipe collections were used may have changed over time, and c) individual writings and manuscripts may deviate from this general conclusion

[3] Horden, The Uses of Medical Manuscripts, pp.1-6.

(take, for example, Paris BnF lat. 13955, a manuscript that, based on its assortment of texts related to the liberal and mechanical arts, was perhaps primarily intended for educational purposes instead of therapy).

A consideration of the ways in which the recipes were used necessitates a comment on the contexts in which they were read. As argued in Chapter 9, the recipe literature analysed in this study is unlikely to have been suitable for the extreme conditions of warfare. It appears, however, that the monastic setting in which the manuscripts were produced would have had a better fit. Yet the osteological evidence indicates that many recipes would have been applicable to a wide range of sites, so the potential for medical practice must be considered in additional contexts. Indeed, given that there is evidence documenting the existence of medical texts in both monastic and lay libraries, royal and aristocratic households also represent likely locations for the practice of medicine related to the information contained in medical texts.[4]

What can be said about the potential use of these texts outside of the most privileged strata of society? Based on the skeletal record, it appears that the recipe literature would have been widely applicable in non-elite contexts, as well. Yet despite the relevance of the treatments to individuals from all levels of society, I suggest that the use of recipes in relation to medical practice was largely limited to elite communities since the consultation of medical writings is predicated on literacy. That being said, there is evidence of monks practising medicine beyond the cloister walls and the possibility that local communities surrounding elite sites or pilgrims passing through ecclesiastical institutions could have benefitted from medical care at these locations.[5] The application of the texts in non-elite contexts cannot, therefore, be ruled out (though, given the need for literacy, the individuals using such material are likely to have come from an elite establishment). The cost of treatments must also be

[4] On the evidence for the circulation of medical manuscripts, see Glaze, 'The perforated wall', pp. 69-79; on lay medical book ownership, see Glaze, 'The perforated wall', pp. 13-14, n. 6.

[5] Horden, 'What's Wrong with Early Medieval Medicine?', pp. 12-13; Park, 'Medicine and Society in Medieval Europe, 500-1500', pp. 68-9.

considered when addressing the contexts of medical practice—could people beyond the elite have afforded the ingredients listed in recipes or would their high prices suggest a more limited clientele? Although many recipes rely on expensive, imported ingredients, others combine local and exotic substances and some use only a handful of exclusively local products. While this range in ingredients suggests that the use of certain recipes would have been restricted to elite communities, it is possible that many recipes may have been more widely accessible. Overall, however, I maintain that these texts were used primarily in elite contexts, such as the royal court, aristocratic households, and monastic communities given a) the literacy needed to engage with this material, b) the resources required to source the ingredients, and c) the intellectual environments and networks necessary to produce or obtain the manuscripts in which this information was recorded. Finally, despite highlighting links to monastic contexts, the implications of this dissertation's conclusions should not be understood as a return to *Mönchsmedizin*. Not only is it evident that manuscripts containing medical material circulated beyond the cloister, but it appears that these recipes would have been relevant and accessible to a wider population—possibly including non-elite individuals, though largely focused on a range of elite environments.

Final remarks: The contribution of this dissertation

In addition to this dissertation's overarching conclusions regarding the relationship between medical knowledge and practice as well as its implications for the contexts in which recipe literature may have been used, the project has made a number of important contributions to the fields of Carolingian history and the history of medicine. First, the selection of textual evidence must be highlighted. Given that this material has been largely overlooked by past scholarship, it generated new findings and, given its scale, these findings are generalisable. Moreover, this dissertation has demonstrated that these recipes offer important insights into the evolution of medical knowledge in the early medieval west and deserve further studies. The extensive volume of data involved in this study also underscores the significance of large sample sizes: in many of the above case studies, my findings challenged or modified the conclusions of earlier research that was based on the analysis of individual texts or manuscripts.

Secondly, this dissertation's dual approach provided new perspectives on the relationship between medical knowledge and practice. In particular, the focus on the question of applicability, and resulting use of osteological evidence to inform my analysis of the recipe literature, has cast fresh light on this relationship. Certain features within the analysis of recipes are also worth noting, such as the creation of new terminology (namely, MMCs, or 'mixed medical collections') to describe the texts more accurately, and the development of new categories of analysis, such as the spectrum of specificity. Furthermore, Part 2 highlighted the complexity of interpreting medieval medical terminology and the dangers of applying modern medical definitions to past disease concepts.

Ultimately, this dissertation offers an innovative approach to investigating the relationship between early medieval medical knowledge and practice, providing new insights into this topic with implications for understanding how and by whom these texts may have been used. Simultaneously, this research underlines the valuable contribution that so-called 'miscellaneous' recipes may make to the study of early medieval medicine as well as the benefits of reading this material in light of osteological evidence. These conclusions thus raise the question, is this dissertation a study in Carolingian history or the history of medicine? I argue that it belongs to both fields and, more specifically, that the most recent scholarship in this research area appears to be blurring the lines between these fields. The work of Meg Leja and Timothy Newfield, for example, should not be divided into either early medieval history or the history of medicine.[6] Rather, Leja and Newfield productively bridge the gap between these distinct fields, engaging with the tools and analytical frameworks

[6] M. Leja, 'Dissecting the inner life: body and soul, medicine and metaphor in the Carolingian era', unpublished Ph.D. thesis, Princeton University (2015), Leja, 'The Sacred Art', pp. 1-34; Newfield, 'The contours of disease and hunger in Carolingian and early Ottonian Europe'; Newfield, 'Malaria and Malaria-like Disease in the Early Middle Ages', pp. 251-300.

of both. This dissertation, too, is situated at the intersection of early medieval history and the history of medicine, examining health and medicine in the Carolingian world. Indeed, this project's exploration of the relationship between medical knowledge and practice is inseparable from its Carolingian context. It is my hope that this dissertation has contributed to the emergence of early medieval medical history as a recognised research area, ushering in a new wave of scholarship that connects to both Carolingian history and the history of medicine. The fusion of these fields presents many promising avenues for future research.

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